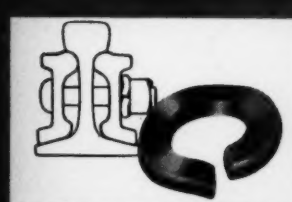
August 1955

RAILWAY TRACK and STRUCTURES

One of Five Specialized Railway Age Publications

Maintenance men have the foresight to keep track in good shape by using millions upon millions of tremendously powerful spring washers to absorb shocks and strains, to equalize bolt tensions, and to protect rail ends and joints.



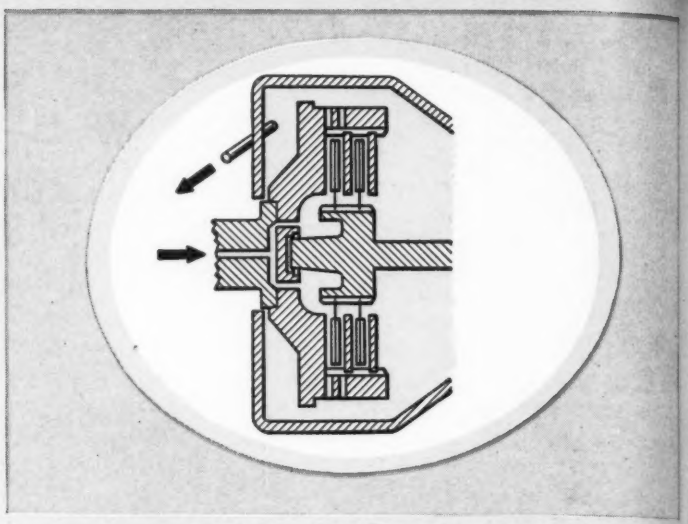
IMPROVED HIPOWERS
IMPROVE TRACK

THE NATIONAL LOCK WASHER COMPANY, NEWARK 5, N. J., U. S. A.
COMPLETE LINE OF RAILWAY SPRING WASHERS

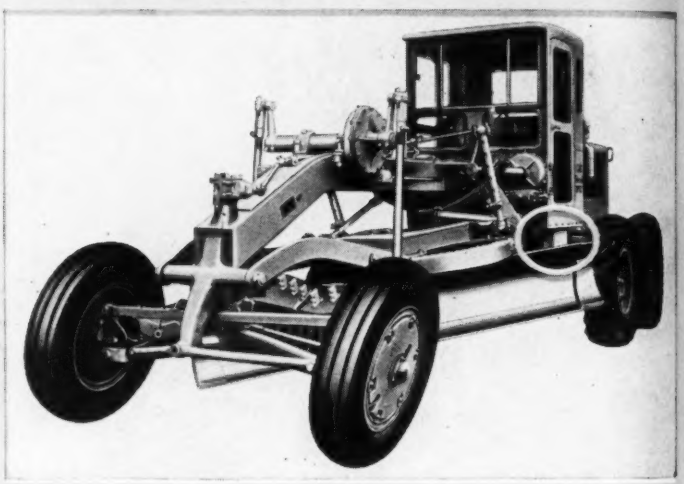
(Great Northern Photo)

CATERPILLAR ANNOUNCES ANOTHER "FIRST":

NEW OIL CLUTCH for the NO. 12 MOTOR GRADER



Arrows show path of oil through housing with clutch disengaged. Facings remain cool and bathed in oil, which is carried to outlet at top by flywheel ring gear. The two steel clutch discs and clutch brake are faced with pressure-processed cork, which gives an excellent coefficiency of friction and long wear.



The new oil clutch for the No. 12 Motor Grader gives you the same reliability and improved performance as the thoroughly job-proved oil clutch in Caterpillar track-type Tractors. Rugged and reliable, it uses oil from the engine lubrication system. Here are some of the things the new oil clutch for the CAT* No. 12 can mean to *you:*

LONGER WORK LIFE—In actual on-the-job tests, clutch facings wear less than the thickness of a human hair in one thousand hours' operation! Thick clutch facings mean that work life is extended thousands of hours before discs need be replaced. And constant "oil bath" lubrication reduces wear on all moving parts.

LESS MAINTENANCE—Adjustment every 1500 hours is not unusual, after initial "break in." This is equivalent to nearly nine months without adjustment on road maintenance work! No external lubrication is needed: internal oil system lubricates pilot and throwout bearings.

GREATER EFFICIENCY—The clutch is constantly cooled, never exceeding normal engine oil temperature. This practically eliminates clutch fade, greatly reduces slippage due to overheating, and means that the clutch retains "like new" operation for thousands of hours.

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

CATERPILLAR*

*Cat and Caterpillar are Registered Trademarks of Caterpillar Tractor Co., U. S. A.

99% OF ALL CAT MOTOR GRADERS ARE STILL IN USE

Anchor your crossings, too

You can give Bethlehem's Hook Twin Tie Plates a number of different jobs with equal success. These simple plates with the hook forged right in will anchor any frog on your system, no matter what tie position, or what the angle or type of frog.

You can also use them to hold down switch closure rails, tee guard rails, graduated riser switches, as well as tongue switches and mates. And, as in the picture, you'll find Hook Twin Tie Plates excellent for use with high- or acute-angle crossings. Here, the engineers said they preferred Hook Twins over the base plate normally furnished with the crossing, because of their easy adaptability.

The hooks are larger and stronger than regular spike heads, and their holding power is independent of track action, freeing the spikes from direct pull. Thus the track is better anchored, both vertical and lateral thrust are checked, and ties are protected from early killing.

Hook Twin Tie Plates distribute the load over a greater tie area, yet cover *only* the ties so as not to interfere with ballast-tamping operations. Normally, three or four lengths are all you'll need to stock, thus inventories can be held low. For full details about this versatile plate, just get in touch with the nearest Bethlehem office.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

BETHLEHEM STEEL

HOOK TWIN TIE PLATES

Published monthly by Simmons-Boardman Publishing Corporation, Emmett Street, Bristol, Connecticut, with editorial and executive offices at 79 West Monroe Street, Chicago 3, Illinois; 30 Church Street, New York 7, New York. Subscription prices: to railroad employees only in the United States and Possessions, and Canada, one year $2.00; $3.00 for two years. Single copy 50 cents. Entered as second class matter at the Post Office at Bristol, Conn., November 26, 1954, under act of March 3, 1879. Volume 51, No. 8.

YOU'RE CLOSER TO LINDE THAN YOU THINK

Trade-Mark

New materials, changing structural requirements, and unexpected emergencies create railroad problems that demand skill and experience . . . LINDE's coast to coast organization of engineers, service representatives, and salesmen in the offices shown on this map, stand ready to help you meet all such problems.

Backed by more than 40 years of accumulated know-how, and equipped with unmatched research and engineering facilities to help customers solve metal-working problems, LINDE is helping the nation's railroads to consistently improve production and lower costs.

These are "PLUS" values you get only from **LINDE**

RAILROAD DEPARTMENT

Linde Air Products Company

A Division of Union Carbide and Carbon Corporation

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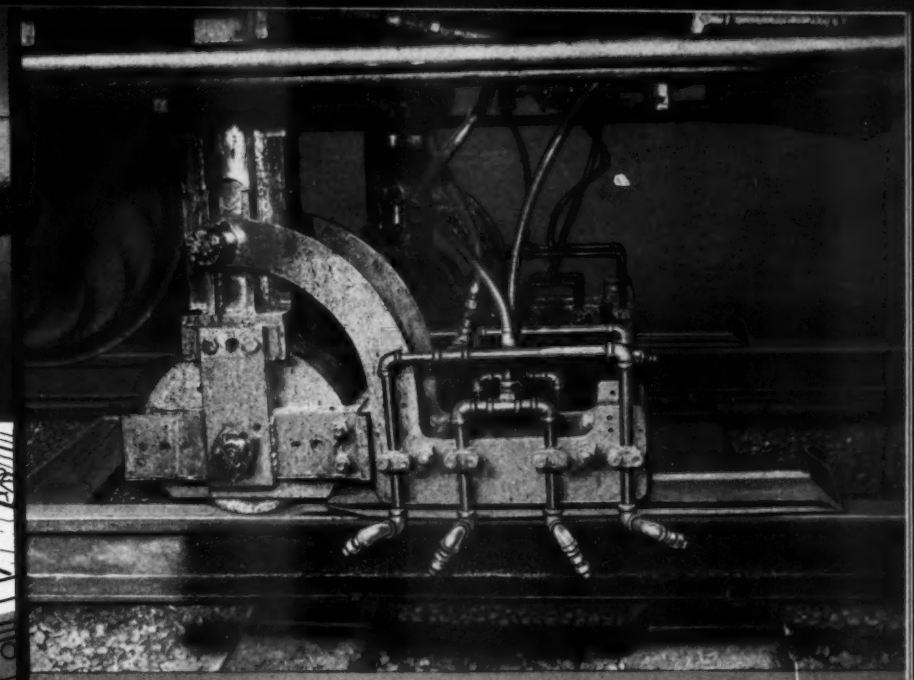
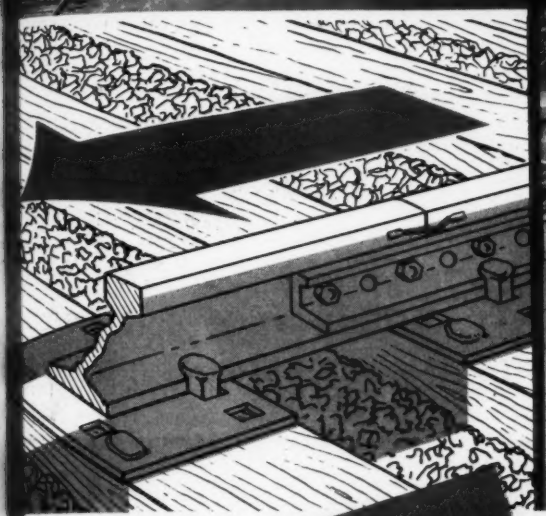
Division of Union Carbide Canada Limited, Toronto
(formerly Dominion Oxygen Company)

"Linde" and "Oxweld" are registered trade-marks of Union Carbide and Carbon Corporation.

Supplying to railroads the complete line of welding and cutting materials and modern methods furnished for over forty years under the familiar symbol - - -





● (Top) *Nalcote* Spray Cars operate at front of work train, with expert crew in charge. You furnish only the work train and crew.

● (Left) Arrow shows direction of *Nalcote* Spray Car travel. Coverage of both receding and approaching surfaces is complete.

● (Above) Unique control devices assure complete, uniform *Nalcote* coverage regardless of variations in gauge and elevation. Shield protects running surface of rail.

Nalcote SERVICE

Nalcote is the superior asphalt-base coating that really protects against corrosion.

●

Nalcote Spray Cars cover up to 140 miles per day.

●

Uniform spray pattern . . . from mid-point of outer edge of rail head to outer edge of tie plate.

STOPS CORROSION of RAIL and FASTENINGS

Here is how you can gain real protection for the large investment your road has in rail and rail fastenings. Schedule now for the fast, efficient—and economical *Nalcote* anti-corrosion treatment!

Aboard *Nalcote* Spray Cars equipped with precision spray machines, experienced operators spread the tough, long-lasting *Nalcote* on rail, tie plates, spikes, bolt heads, angle bars and anchors.

All this at a cost that varies little from the cost of manually painting angle bars alone.

If you would like further information—and an early application date, call your Nalco Representative or write direct.

NATIONAL ALUMINATE CORPORATION
SPRAY SERVICES DEPARTMENT

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ANOTHER *Nalco*®

SERVICE . Serving Railroads through Practical Applied Science

Now! Do All Three Clearing Jobs with One HOMELITE Chain Saw

New Versatile Attachments for Model 17 Chain Saw Will Clear Everything from Brush and Brambles to Four-Foot Trees. Save Money on Equipment and Job Time by Following These Three Steps:

1 Clean Out Underbrush — Attach the new Homelite Brush Cutter to your Model 17 Chain Saw . . . in minutes. Perfect balance makes it a cinch to operate. Clears dense undergrowth, brush and small saplings four times faster than hand-clearing methods. Friction-free flexible shaft delivers full 3.5 horsepower to 10-inch circular saw.

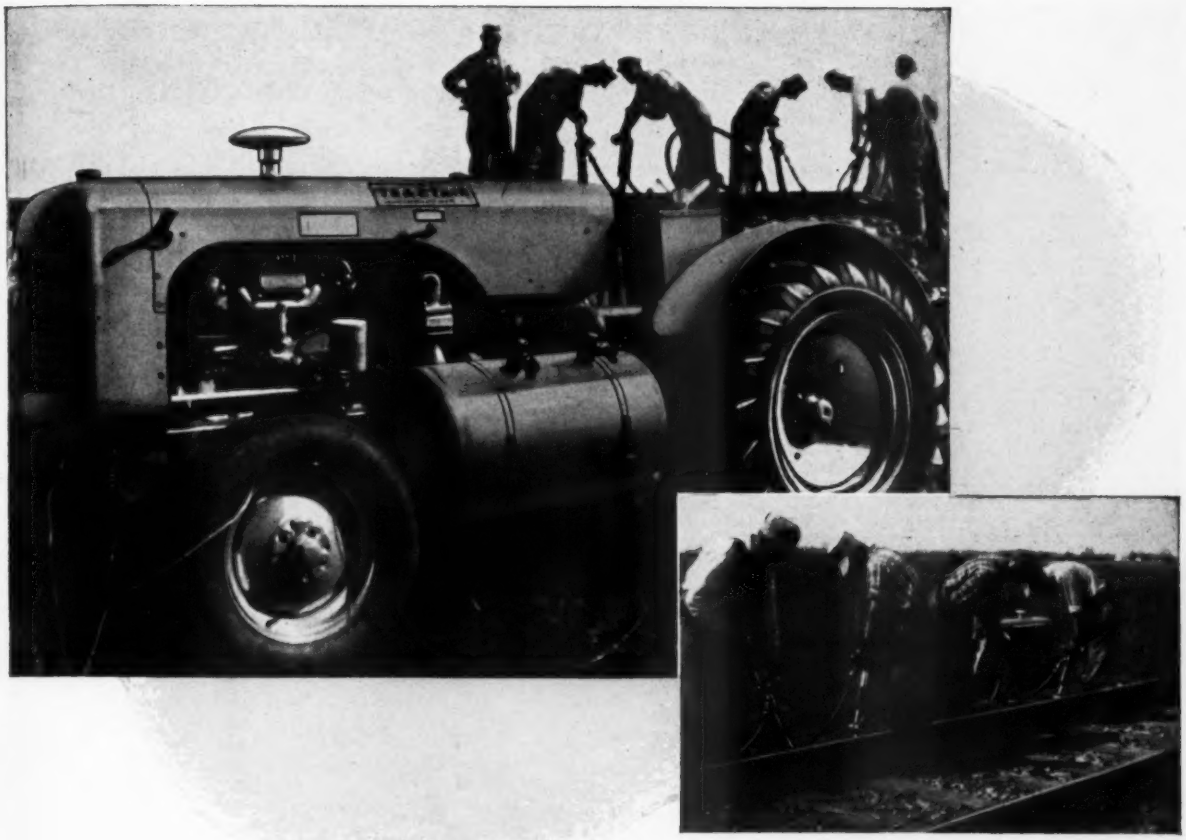
2 Clear Small Trees and Saplings — In a jiffy the new Homelite Clearing Attachment converts your Homelite Model 17 Chain Saw to a fast-cutting, light-weight clearing tool. Plunge cuts or plunge bucks and makes limbing an easy job. Open guide rail prevents pinching and binding . . . takes the backache out of knocking the small ones down and cutting them up for haulage.

3 Now For The Big Stuff — With the standard guide bar you can bring down trees over four feet in diameter. The Homelite Model 17 is light in weight, easy to handle and packed with more horsepower per pound than any other one-man chain saw ever developed. (3.5 hp — 22 lbs.)

With its new attachments the Homelite Model 17 Chain Saw will give you the versatile, fast-cutting, dependable performance you need to save time and make real profits from clearing. Ask your Homelite Representative for a free demonstration or write for information.

PERFORMANCE · DEPENDABILITY · SERVICE

HOMELITE
CORPORATION
208 RIVERDALE AVENUE • PORT CHESTER, N. Y.
Carryable Pumps • Generators • Blowers • Chain Saws



Get Rid of Slow Orders – in a Hurry

... use the mobility of Le Roi Tractair and the easy holding of Cleveland Tampers, to tamp your bad sections faster

LE Roi's Tractair unit is an off-track compressor-tractor that has good traction and low center of gravity. It readily crosses or straddles heavy-duty rail. It climbs embankments and works on a two-to-one slope with safety. That's why Le Roi Tractair can take air power anywhere, can provide you with a quick, easy way of getting rid of slow orders caused by bad sections of track.

And, since the Tractair unit compressed-air output has been increased from 105 cfm to 125 cfm you can handle four, easy-holding, Cleveland C10T, heavy-blow tie tampers, with air power to spare. The fast, hard-hitting blow, and easy-holding qualities of the Cleveland machine help your section hands do faster, more uniform work.

And Tractair can do many more jobs besides tamping — such as driving spikes, breaking pavement, driving moil points for grouting, powering earth augers, ditching, light grading, weed mowing, stockpiling ballast, cinders, etc., handling off-season work for B&B, Signal, T&T, and Water Service Departments.

Get all the facts on this redesigned Tractair with its increased power. Write our Railroad Sales Department, 327 South LaSalle Street, Chicago 4, Illinois, or to us for our latest bulletin.

T-37

LE ROI *Division of Westinghouse Air Brake Co.*

Milwaukee 14, Wisconsin

PORTABLE AIR COMPRESSORS · TRACTAIR · STATIONARY AIR COMPRESSORS · AIR TOOLS · ENGINES

... smooth ride for oil on the move!

DOW PRODUCTS

keep roadbeds clear of grass and weeds... control brush on right-of-ways

Oil and a thousand-and-one other products are rolling now on railway lines kept in first-class shape with chemicals. Specific Dow chemicals built to do specific jobs now offer railway men a better way to maintain vegetation-free right-of-ways at lower cost per train-mile.

New Dow Dalapon Sodium Salt Solution* teams up with the famous 2-4 Dow Weed Killer, Formula 40—to maintain mile after mile of clean ballast and berm. The two—a systematic grass killer and a highly effective 2,4-D weed killer—should be combined to control grasses and broad-leaved weeds in roadbeds in a single application.

Brush and weeds along the right-of-way call for spraying with Esteron® Brush Killer. Its low-volatile 2,4-D and 2,4,5-T esters give good control of tough woody vegetation—keep the right-of-way neat-looking and economical to maintain. Your inquiries are invited. Dow sales and technical men are available for consultation and assistance on your vegetation control program. THE DOW CHEMICAL COMPANY, Agricultural Chemical Sales Department, Midland, Michigan. In Canada: Dow Chemical of Canada, Limited, Toronto, Canada.

**Available in tank car quantities only.*

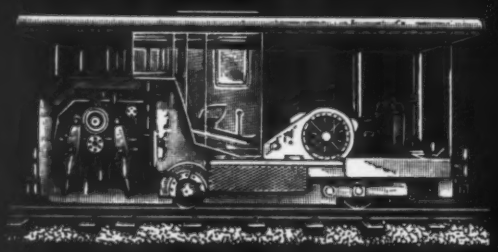
you can depend on DOW AGRICULTURAL CHEMICALS

DOW

FOR RAISING

Matisa

SELECTIVE DEPTH TAMPING

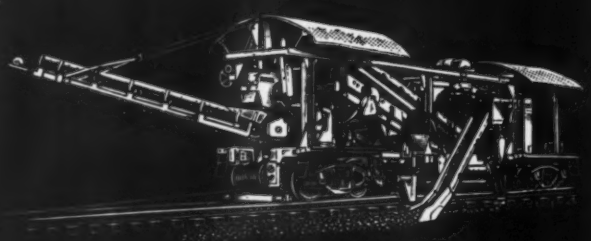


With vibratory compaction—Now at your budget level! The True tamping principle for surfacing or making high or low lifts.

OR

Matisa

UNDER-THE-TIE BALLAST CLEANING



The only ballast cleaner that does a complete job. Cleans (or excavates) ballast in cribs, under ties, on shoulders, between tracks. Improves clearance in tunnels and at O.H. bridges, lengthens cleaning cycle.

LOWERING TRACKS

Matisa EQUIPMENT CORPORATION

1020 WASHINGTON AVE. · CHICAGO HEIGHTS, ILLINOIS

TRACKWORK SPECIALISTS ALL OVER THE WORLD

224 S. MICHIGAN AVE. · CHICAGO 4

News Notes

. . . a resumé of current events throughout the railroad world

RAILWAY
TRACK and STRUCTURES
AUGUST, 1955

An increase of 10.4 per cent in freight-car loadings in the third quarter of 1955, compared with the same period of last year, has been forecast by the 13 regional shippers advisory boards.

•

Estimated net income for Class I railroads in May, after interest and rentals, was $86 million, more than double the $40 million reported for May 1954. Net income for the first five months of 1955 was estimated at $329 million compared with $172 million for the same period last year.

•

A device for detecting hot boxes as a train moves by is expected to be available soon. When mounted alongside a track, the infra-red-ray detector will set the next block signal to stop a train where a journal is running dangerously hot, or it will automatically notify the next regular stop if a journal is warm enough to need checking, but still safe.

•

How diversion of mail traffic can affect rail passenger service is pointed up by the Reading's announcement that, on July 18, it will cut its week-day schedule between Allentown, Pa., and Harrisburg from three trains daily to one. The cut was attributed directly to transfer, July 1, of mail from the railroad to highway carriers. The Reading's resulting loss of mail revenue will approximate $400,000 a year, two-thirds of all revenue earned on the six trains.

•

Increasing the nation's serviceable freight-car fleet by some 80,000 new or newly repaired units and upgrading additional cars for higher-class loading—that's the aim of a three-way program agreed to by member roads of AAR at a special meeting held in Chicago June 24. It is hoped that the program will be able to rectify the current "no surplus" car situation where the serviceable car fleet has ben unable to keep up with the increased demand for cars.

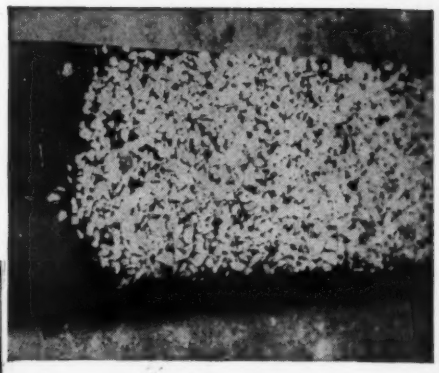
•

About 17 railroads will be eliminated from the Class I group designation by a proposal now under consideration by the ICC. The plan calls for an increase from $1 million to $3 million in the minimum annual-revenue requirement for designation as a Class I railroad. Furthermore, the proposal contemplates two classes of roads instead of the present three. Class II roads would be all those with annual gross of less than $3 million.

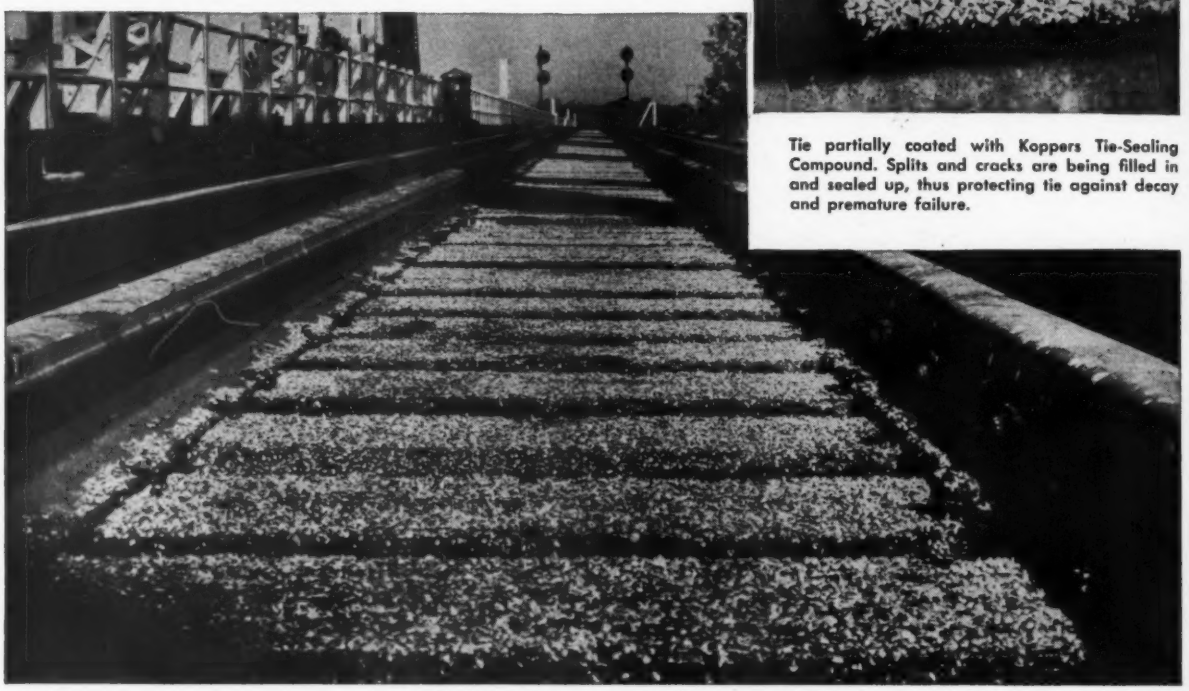
•

The General Motors lightweight train, which has been rumored for several months, has now been officially announced along with specific details of its construction. The train will consist of 10 coaches and a single 1200-hp diesel-electric locomotive. It will cost less than $1000 per seat when built in volume production as compared with a cost of about $3000 for conventional lightweight equipment now in regular service in this country. Harlow H. Curtice, president of GM, stated: "General Motors has no intention of going into the railroad passenger-car building business. It is primarily interested in promotion of the use of its diesel motive power and presents the new cars as a service to its customers in the hope that they may offer a solution to the passenger deficit problem."

Prevent premature tie failure with Koppers Tie-Sealing Compound



Tie partially coated with Koppers Tie-Sealing Compound. Splits and cracks are being filled in and sealed up, thus protecting tie against decay and premature failure.



Koppers Tie-Sealing Compound is adding years of service to these bridge ties. Covering of fine stone provides a tie surface that is well protected against the danger of costly fire.

To FIND OUT exactly why ties fail prematurely, a leading railroad recently studied 400,000 defective ties. The conclusion: *over fifty per cent* of the ties which failed were victims of mechanical damage and weather . . . primarily splitting or plate cutting.

This is proof that Koppers Tie-Sealing Compound is badly needed. This specially-processed coal-tar coating fills in and seals up the natural checks and splits in the tie and prevents further splitting and checking. Unless thus protected, grit, ice formations and weathering, accentuated by the impact of heavy traffic, make these openings grow larger and deeper to bring on premature failure.

Koppers Tie-Sealing Compound reduces the number of casualties resulting from plate cutting. It forms a protective barrier around the tie plate—a barrier that keeps out grit and other foreign matter that accelerate the tie-cutting action.

Koppers Tie-Sealing Compound is completely compatible with creosote; it "works with" creosote to provide *extra* protection. Based on actual experience, this protective coating will increase the service life of bridge or crossties by at least five years. For full information, write Koppers Company, Inc., Tar Products Division, Pittsburgh 19, Pennsylvania.

DETAILS AND PRICE INFORMATION ON REQUEST

KOPPERS® **TIE-SEALING COMPOUND**

KOPPERS COMPANY, INC.
Tar Products Division, Pittsburgh 19, Pennsylvania

DISTRICT OFFICES: Boston, Chicago, Los Angeles, New York, Pittsburgh, and Woodward, Alabama

Three completely New

PAYLOADER® tractor-shovels

with new "more-yardage" features

POWERFUL PRY-OUT ACTION

Tremendous pry-out force is obtained by using the breakout pads on the ground as a fulcrum for leverage. The load forces opposing the pry-out action are thus transferred to the ground through the pads instead of to the axle, wheels and hydraulic system of the machine.

HU

40° BREAK-OUT at ground level

You can get HEAPED BUCKET LOADS and you get them FASTER and EASIER WITH THIS NEW BUCKET ACTION. Most important of all — you KEEP BIGGER PAYLOADS—because the bucket can be tipped back a full 40 degrees at ground level before it is raised, eliminating spillage.

HH

SAFETY and STABILITY

Special boom-arm shape and positioning keeps moving members out of operator's reach at all positions. Close, low, load-carry position and longer wheelbase provide stability and balance for fast maneuvering — with safety.

HO

PAYLOADER®
MANUFACTURED BY
THE FRANK G. HOUGH CO. LIBERTYVILLE, ILL.
SUBSIDIARY—INTERNATIONAL HARVESTER COMPANY

These three all-wheel-drive "PAYLOADER" units are outstanding examples of Hough's continuing pioneering and leadership in tractor-shovel design. They have more digging power, get big bucket loads easier, can carry them faster and safer.

They are full of other features and improvements that boost output, operator comfort and safety and that lower the cost of digging, scooping-up, loading, moving and piling earth and bulk-materials.

Your "PAYLOADER" Distributor is ready to demonstrate these new units and what they can do — for you.

HOUGH-DESIGN HOUGH-QUALITY

More Horsepower per bucket capacity than any other standard models. Either diesel or gasoline engines available.

Easy to Operate Fullest operator visibility for safe, fast maneuvering; power steering; powerful hydraulic brakes; adjustable seat with molded foam-rubber cushions.

Powerful Transmissions Powershift transmission is standard equipment on the big model HO; four-speed full-reversing types on model HH and HU. Torque converter drives are standard equipment on all models — multiply engine torque up to 350% — act as shock absorbers for the entire power train.

THE FRANK G. HOUGH CO.

Send full information on new "PAYLOADER" Tractor-Shovels

- ☐ Model HU 1 cu. yd.
- ☐ Model HH 1½ cu. yd.
- ☐ Model HO 2 cu. yd.

Name .....
Title .....
Company .....
Street .....
City .....
State .....

One of the 160 Uses of CONCRETE on Railroads

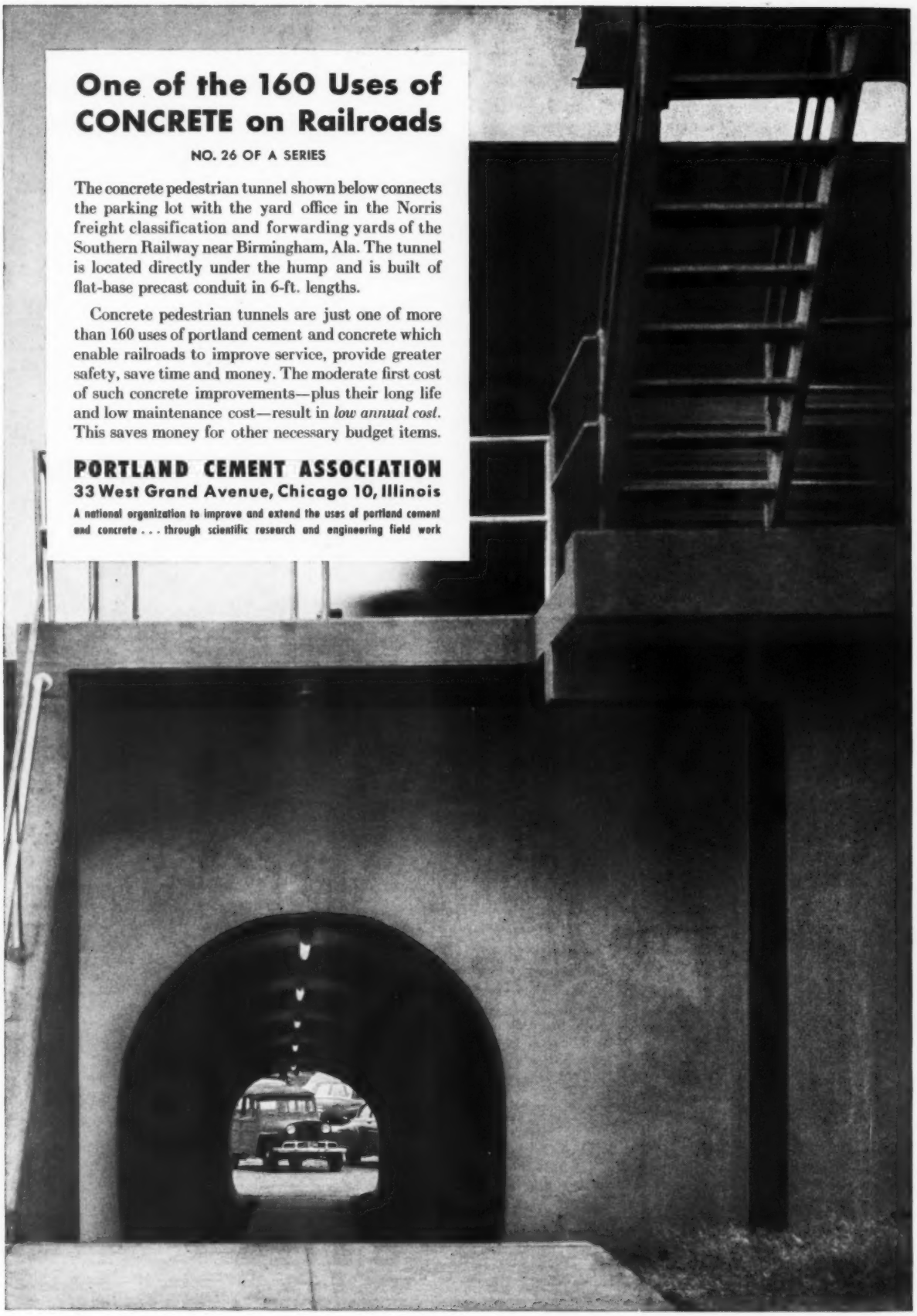
NO. 26 OF A SERIES

The concrete pedestrian tunnel shown below connects the parking lot with the yard office in the Norris freight classification and forwarding yards of the Southern Railway near Birmingham, Ala. The tunnel is located directly under the hump and is built of flat-base precast conduit in 6-ft. lengths.

Concrete pedestrian tunnels are just one of more than 160 uses of portland cement and concrete which enable railroads to improve service, provide greater safety, save time and money. The moderate first cost of such concrete improvements—plus their long life and low maintenance cost—result in *low annual cost*. This saves money for other necessary budget items.

PORTLAND CEMENT ASSOCIATION
33 West Grand Avenue, Chicago 10, Illinois

A national organization to improve and extend the uses of portland cement and concrete . . . through scientific research and engineering field work



ONE MAN & ONE HELPER

KERSHAW BALLAST REGULATOR, SCARIFIER AND PLOW

KERSHAW TRACK BROOM

FINISHED REGULATING AND TRACK DRESSING JOB DONE WITH KERSHAW MACHINES

to do a COMPLETE BALLAST REGULATING and TRACK DRESSING JOB

When you use the Kershaw Ballast Regulator and Plow, and a Kershaw Track Broom in your surfacing gangs, you get a complete job including the ballast regulating, shaping, distributing, the removing of the loose ballast between the rails and the transferring of the ballast from one side of the track to the other.

The Ballast Regulator and Plow is used one day by the operator and helper ahead of your surfacing gangs. The same two men set the Regulator off the track and then operate the Track Broom to complete the dressing job behind the tampers.

The operator and the helper using the Regulator one day and the Track Broom the next day will complete the regulating of the ballast and the dressing of the track without any shovels or extra labor at the rate of one mile per day.

The Kershaw Ballast Regulator, Scarifier and Plow performs three jobs on your surfacing gangs. First it scarifies, breaks mud pockets and plows the old ballast from the tie ends ahead of your retimbering gangs. Next, after the ballast is unloaded from your ballast cars, the Regulator and Plow is then used to place and distribute the ballast ahead of your tamper and finally, after ballast has been unloaded and track surfaced, the same machine is used to regulate, shape and finish the ballast shoulder to your ballast section.

The Kershaw Track Broom following the Regulator, operated by the same two men that operated the Regulator, then is used to sweep and remove the loose ballast from between the tracks and the tie heads, placing it on the shoulder and completing the track to your own special ballast cross section without the use of shovels or ballast forks.

But the Kershaw Regulator and Track Broom aren't limited to just these operations. All told, the Ballast Regulator can be used in fourteen different operations. The Track Broom has proven itself in yard operations by cleaning the tracks between the rails.

THREE PLANS

All Kershaw machines are available under any one of the following three plans:

1. Three Year Lease—Lease Kershaw machines for three years.
2. Six to 12 Months Rental With Option To Purchase—Lease a Kershaw machine for six to 12 months. Any time during that period you may purchase the machine with 90 per cent of rentals applying to the purchase price.
3. Outright Purchase.

Recognize This Symbol of Leadership

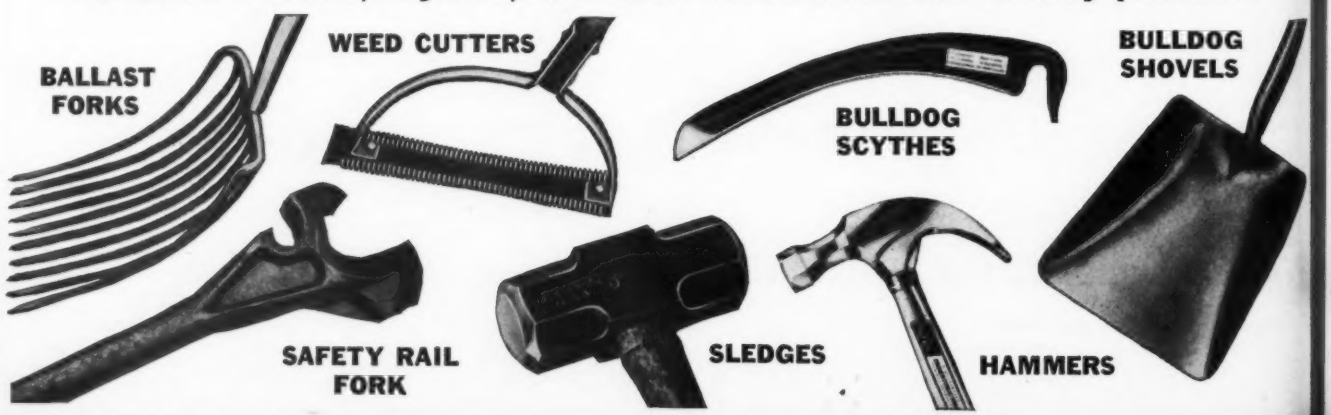
KERSHAW MANUFACTURING CO. INC

MONTGOMERY ALABAMA

NEW LUGS BOOST HOLDING POWER 25%

These lugs, forged into the BULLDOG anchor clamp, put the anchor spring under powerful compression which increases holding power 25%.

BULLDOG shovels, scythes, and other TRUE TEMPER railway products



TRUE TEMPER ANNOUNCES:

New, improved BULLDOG Rail Anchor with 25% greater holding power!

A major improvement has been made in the True Temper rail anchor which increases the holding power 25%. We're calling this new anchor the True Temper BULLDOG rail anchor.

Veteran railroaders will remember the original True Temper Stead anchor which gripped the rail by heavy *compression* in the anchor spring. Then we developed the anchor, now in general use, which grips by powerful *tension* in the spring.

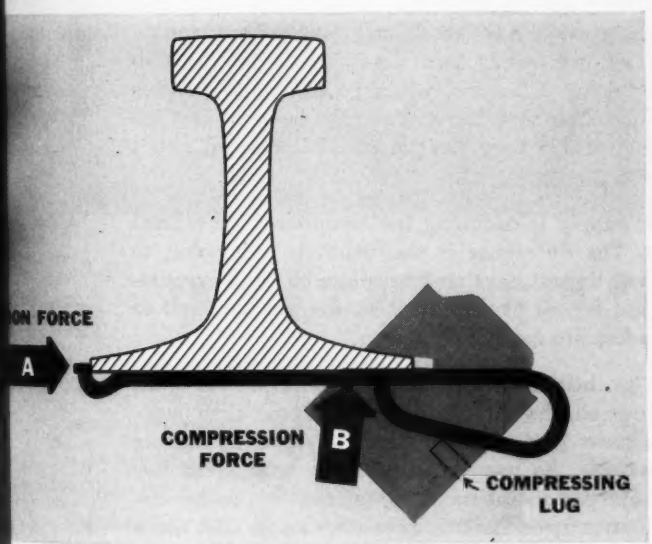
The new BULLDOG anchor combines *both* these powerful forces—tension *and* compression. Result: holding power is increased 25% as shown by precision laboratory tests (see below).

BULLDOG anchor is easy to apply

The True Temper rail anchor is shipped as a unit and applied as a unit—by one man using any striking tool, maul or sledge. Track laborers like it because it's easy to apply. The BULLDOG anchor consists of two factory-assembled elements—spring and clamp—and it gives you advantages no one-element anchor can provide. It *cannot* be overdriven. It fits new or worn rail. It can easily be removed and it retains its holding power on re-application.

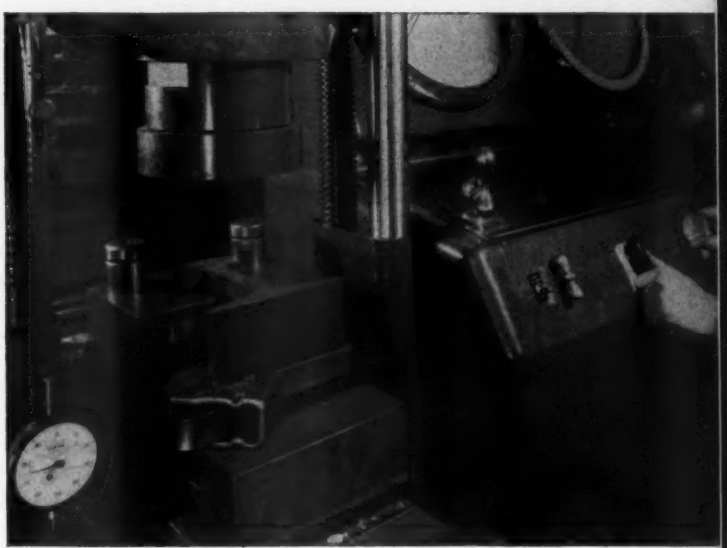
Write for free brochure on BULLDOG anchor

True Temper BULLDOG anchors are now available for all rail sizes. Ask your True Temper representative for complete information. And write now for free illustrated brochure. True Temper Corporation, 1623 Euclid Ave., Cleveland 15, Ohio.



BULLDOG GRIPS BY TENSION AND COMPRESSION

The anchor spring, being under tension, *pulls* the jaws of the clamp against the rail (Force A). However, the spring is also under *compression* and it simultaneously *squeezes* the clamp tight on the rail (Force B).



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RAILWAY
TRACK and STRUCTURES

Subject:

Dear Readers:

Now's the Time

The current railroad picture brings to mind a cycle of developments that is all too familiar to the maintenance man. This cycle, which parallels fluctuations in business generally, usually spans a period of months or several years. It is characterized by these steps or phases:

(1) Railroad business declines; (2) as revenues go down the railroads retrench by reducing expenditures for maintenance of both the fixed property and of equipment; (3) as a result of the retrenchment a decline occurs in the number of serviceable cars; (4) railroad business begins to improve; (5) a car shortage develops; (6) shippers and government officials begin agitation to get the railroads to increase the car supply; (7) the railroads start ordering more cars. Step No. 7 completes the cycle until the next one starts.

There is something vital missing from this cycle. It is the absence of any public recognition that the fixed properties have also suffered depletion and that they need replenishment the same as the car supply. It isn't difficult to explain this omission.

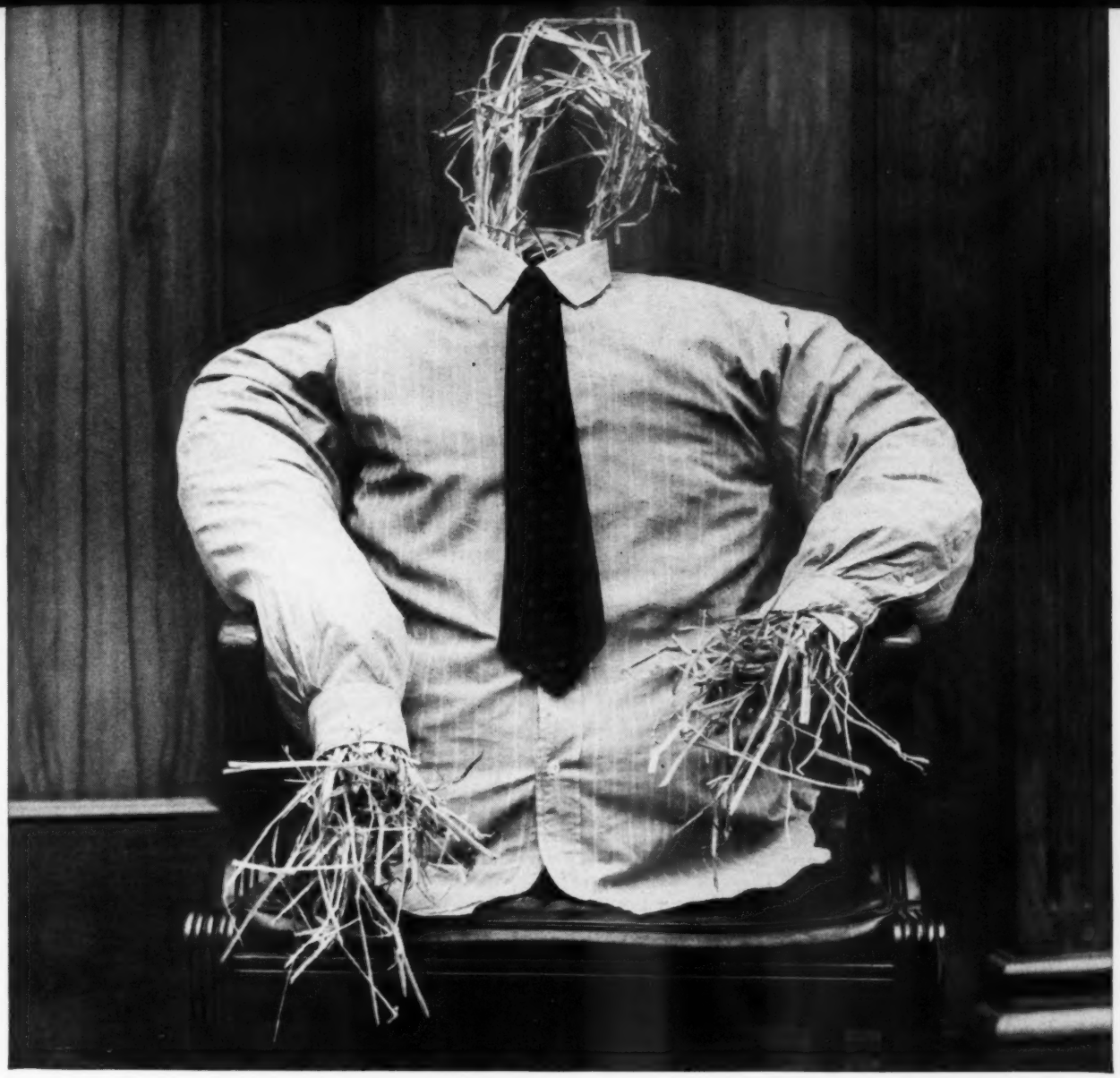
A car shortage is something that becomes noticeable right away and has a direct effect on the shipper. If a railroad can't supply an adequate number of cars when the shipper needs them he is naturally going to register an immediate complaint. Likewise, when government agencies interested in national defense see that the car supply is becoming inadequate to handle war-time traffic they are not at all backward about making thir feelings known.

Obviously, while the car supply is declining the condition of the fixed plant is also deteriorating. The difference is that what is happening to this plant cannot be seen, nor does it have an immediate effect. Nevertheless, a sound track structure is just as important to the shipper, and to national defense, as is an adequate car supply.

A set of conditions such as those described actually exists at this writing. A car shortage has occurred, the shippers have registered their complaints and the railroads have pledged themselves to take immediate steps to overcome the shortage. As usual, however, no loud voice has been raised in favor of enlarged maintenance programs to restore deficiencies in the tracks and structures. Maintenance men know that these deficiencies exist and that they will have to be corrected. They also know it is useless to expect that anyone outside the industry will show much interest in the deferred-maintenance problem.

There is only one thing for the maintenance man to do—and that's to "toot his own horn" where management can hear the noise. With budget time approaching, now is the time to do it. And with economists already predicting a continuation of the high business level in 1956, there is every reason to believe that railroad managements, prodded by M/W officers, will be in a receptive mood when enlarged maintenance programs are placed before them.

MHD



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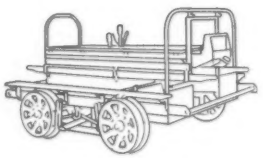
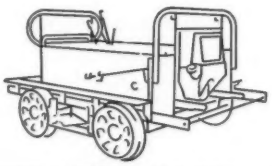
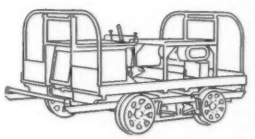


***M14 SERIES H LIGHT SECTION CAR** can carry six men, yet can be operated by only two. Features include a special steel frame, demountable wheels and a dependable 5- to 8-h.p. engine. Load capacity: 6 men, 1200 lbs.*

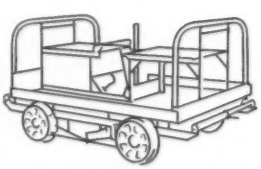


***S2 SERIES H SECTION CAR** offers unusual strength and performance. Features include a roller bearing engine, condenser cooling, re-enforced extension lift handles, demountable wheels. Load capacity: 8 men, 1800 lbs.*

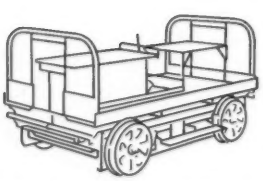


***A3 SERIES D GANG CAR** features a 17-h.p. engine, four-speed transmission and four-wheel braking. Adaptable as a heavy-duty section car. Economical in cost and in maintenance. Load capacity: 8 men, 2000 lbs.*

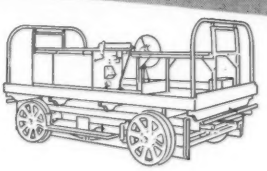
***S2 SERIES AA STANDARD SECTION CAR** is powered by a new Fairmont two-cylinder, two-cycle, water-cooled engine. Special features include a differential front axle, demountable wheels, extension lift handles and four-wheel brakes. Load capacity: 8 men, 1800 lbs.*



***A5 SERIES C GANG CAR** can pull 6 trailers loaded with 120 men at 30 m.p.h. Features include an efficient 31.5-h.p. engine and special frame construction. Four-speed, two-way operation. Load capacity: 8 men, 3000 lbs.*



***A6 SERIES F HEAVY-DUTY GANG CAR** is expressly designed for heavy work. Features include a 100-h.p. engine; spring-mounted frame; four-speed transmission; two-way operation. Load capacity: 10 men, 3,500 lbs.*



***A8 SERIES B HEAVY-DUTY GANG CAR** features a 130-h.p. V-8 engine, four-speed transmission, heavy-duty demountable wheels and a hydraulic turntable. Makes an excellent hump car. Load capacity: 14 men, 4000 lbs.*

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RAILWAY

TRACK and STRUCTURES

August, 1955 **Vol. 51, No. 8**

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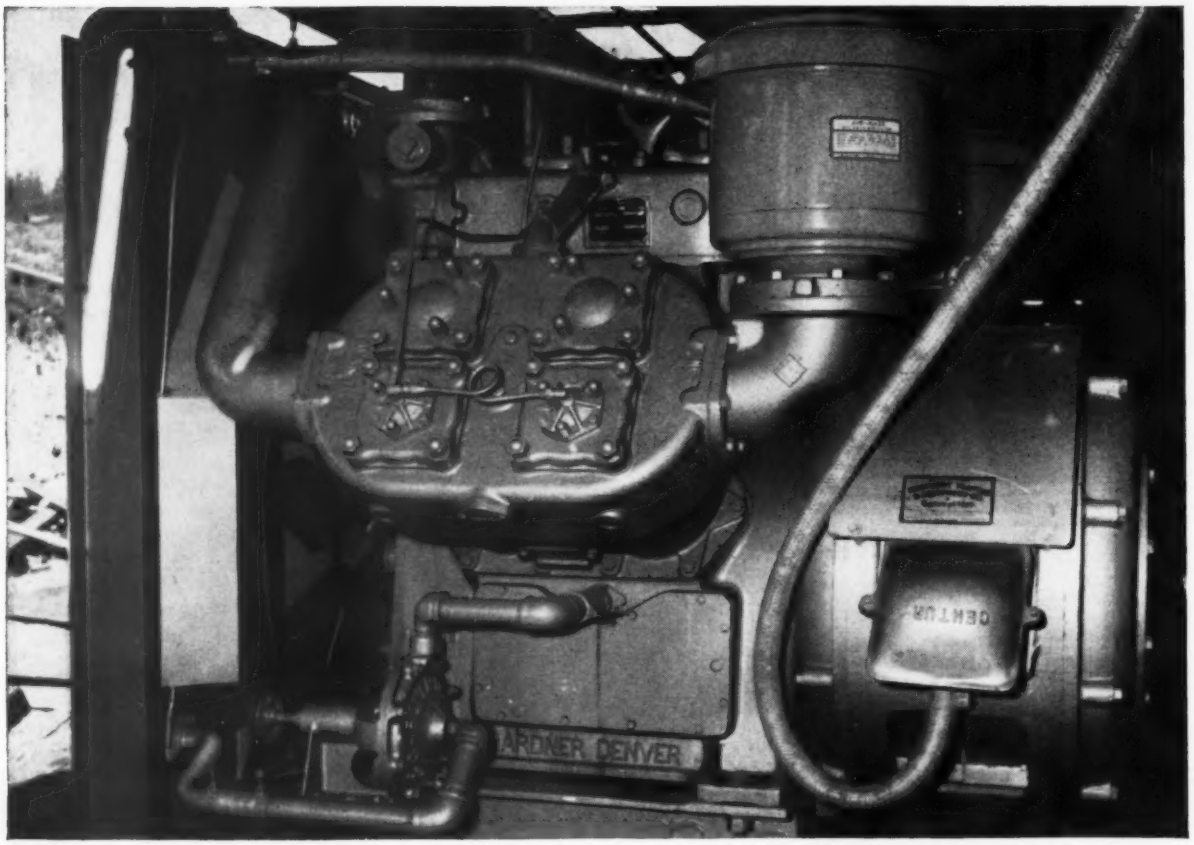

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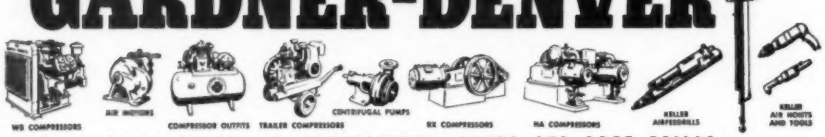

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TRACK and STRUCTURES

Eventually — Why Not Now?

Every alert and informed M/W man is aware of the progress that has occurred in the development of machines for promoting efficiency in track maintenance. There is equal awareness of the fact that the use of this equipment to maximum advantage is prevented on many roads by agreements with the operating brotherhoods.

Eventually this problem will have to be tackled and solved. It is unthinkable that application of the fruits of technological progress can be thwarted indefinitely in an era when it is taken for granted throughout industry that efficiency through mechanization, or "automation," is necessary to survival.

There is no question but what the problem is one of the most difficult ever to be laid before M/W officers. Because it is so complex, there may be a tendency to take the position that it can't be solved. To have this attitude is to be admitting defeat even before the issue is joined. There is no alternative but to recognize the existence of the problem and then to face it squarely with the conviction that eventually it will yield to perseverance and courage.

The situation has existed for so many years that there may be an inclination to accept it as being unalterable, as one does a bad habit of long standing. But the pressure is growing to change this particular "bad habit." By this we mean that the need for economy is increasing as costs go up, while at the same time more and better machines are being created to reduce these costs.

Just how this problem is going to be resolved in the end is not clear at this time. However, there is an important step that can be taken now. M/W officers can bring the subject out from "under wraps" on their individual lines and insist that it be made a topic of discussion, perhaps for bargaining purposes, in future negotiations with the operating brotherhoods.

Look for "By-Product" Uses

Facilities or devices which speed up and improve the caliber of maintenance and construction work are continually being developed. It has been noticed that sometimes these improvements are found to have "by-product" uses and applications not considered when the idea was originally conceived.

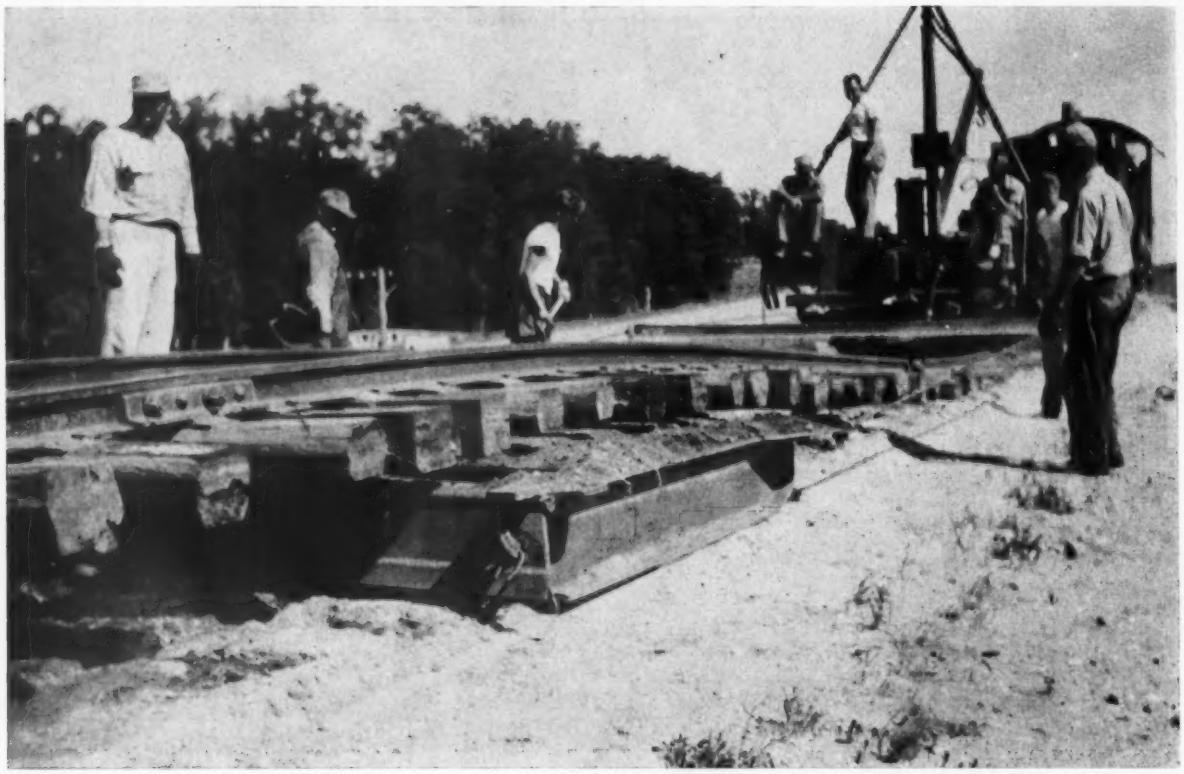
Savings from these secondary uses are often, in themselves, sufficient to amortize the cost of the original facility. The incidental use may then become a major function.

An example is presented by the Santa Fe's experience with devices installed on bridges to facilitate inspection of those parts and portions that are otherwise difficult to reach. Following the development of these bridge inspection aids, which are described in this issue, it was suggested that they could also be used to good advantage by painting and repair gangs. In fact, the resulting reduction in the amount of scaffolding required for these operations produced dollar savings in labor and material sufficient to repay the cost of the initial installations in a comparatively short time.

Another railroad developed a steam-generator car for use with pile-driving operations in diesel territory. This car proved so effective as a stand-by unit for supplying steam to wrecker units and for emergency use in heating trains where there had been a failure in the regular supply, that it is now frequently difficult to secure it for use in the service for which it was originally designed.

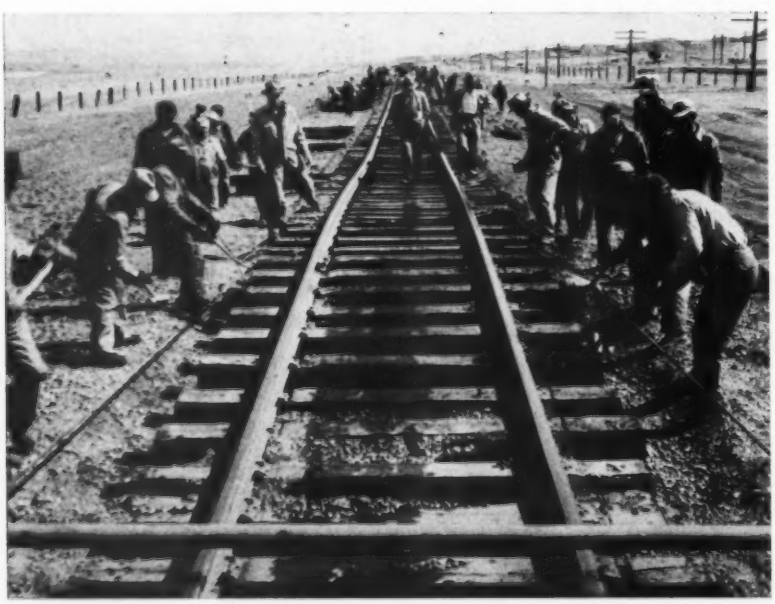
When requests are made for appropriations necessary to cover the installation of facilities or the purchase of devices designed to improve maintenance practices, the chances of their approval will be enhanced if the savings resulting from by-product uses are mentioned in the request.

How to Raise Track—Fast!



TRACK is "humped" over top of ballast sled as unit is pulled along behind work train. Ballast in cribs falls through as track glides over top of sled, completely skeletonizing track and at same time raising it on ballast from the cribs.

. . . "Sleds" Make It a Downhill Job



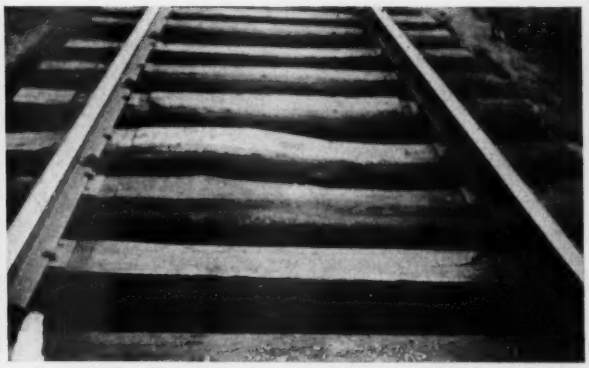
OLD TIES are knocked down with heavy mauls and removed while track is "humped up." New ties are inserted in skeletonized track behind.

● To completely skeletonize a mile of track, raise it from 4 to 6 in and renew approximately 400 ties—all in one 8-hr day—may seem like quite a task. But that is just what the Northern Pacific has been doing with two outfits working at separate locations on its system.

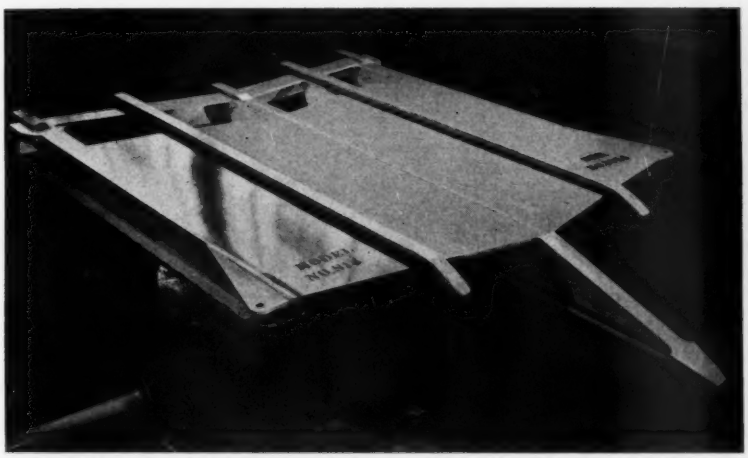
Using special equipment in the form of ballast "sleds" and "plows" for skeletonizing and raising track, the road plans to completely reballast 113 miles of track during the current working season. In operation, these devices, one at a time, are pulled along under the track behind a work train. As the plow or sled moves along, the track is "humped up" over the top of it, the bottoms of the ties sliding across runners on top of the device.

With the plow, the material in the tie cribs falls through as the track glides over the top of the unit. Wings on the plow then carry the crib material to the outside of the track and deposit it along the

BEFORE using sled, cribs were almost full of gravel ballast which had not been too satisfactory for holding track.



AFTER pass with sled, track is completely skeletonized, utilizing gravel ballast from cribs for initial raise.



BALLAST SLED is constructed with runners on top for ties to slide on. Ballast falls down through opening at rear (upper left) of sled.

BED for ties to rest on is smooth and level after passage of sled.

Using special ballast "plows" and "sleds," the NP is skeletonizing track, making an initial lift on new ballast and renewing ties without the use of jacks. The initial lift is followed by a maximum 2-in finish raise using a production tamper and standard surfacing techniques, to give a total raise of about 6 in on branch lines and 8 in on main lines.

shoulder. As the plow passes, the track again settles down onto its original bed, completely skeletonized.

The ballast sled works in the same manner, except that, instead of removing the crib material from the track, it redeposits the ballast in a layer under the ties. Thus, the track is skeletonized, but this time it has been raised on the material from the cribs. As the track comes to rest behind the sled, it has been elevated a maximum of about 3½ in.

Mannix Equipment Used

The plow and sled equipment is owned by Mannix International, Minneapolis, Minn., a subsidiary of Mannix, Ltd., Winnipeg, Man. The sleds and plows are available for rental to the railroads on the basis of so much per track-foot for each piece of equipment. Both units are 12 in deep with runners on the tops and bottoms. They are each about 12 ft long and 11 ft wide; the sleds weigh 3 tons and the plows 2 tons.

When in operation the devices are pulled behind a material flat car, with a cable rigging attached to a guide belted to the flat car's end sill and to each side of the plow or sled. The cables are 30 ft 2 in long, and, to provide control for keeping the plow or sled centered under the track and running straight, a ratchet adjustment is provided on the cable assembly where it connects to the flat-car guide. By varying the angle of pull, particularly on curves, the man operating the ratchet mechanism is able to keep the sled or plow in proper alinement.

On the NP the plows are being used only in territories where ballast is badly fouled, making it desirable to remove the material from the cribs before raising on new ballast. Following the plowing-out operation, ballast is unloaded, and the sleds are then used to raise the track on new ballast.

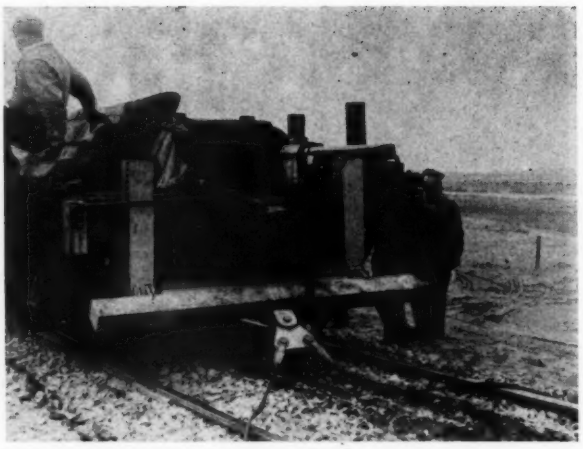
At locations where existing ballast is satisfactory for raising, only the ballast sleds are used. They are pulled through once to raise the track to skeletonize on the existing ballast, then are pulled through a second time, after new ballast is unloaded, to give the track another lift. The last pass of the ballast sled is followed by a 2-in finishing raise using standard track-surfacing procedure and a production-type tamper.

Total Raise 6 to 8 In

The total track raise effected by the ballast sleds and the finishing raise varies from 6 in on branch

Raising Track on New Ballast . . .

SECOND RAISE with sled is made after fresh stone ballast has been unloaded in the skeletonized track.



TOWING DEVICE, attached to frame of material flat car, provides ratchet mechanism for keeping sled in alinement.

SPECIAL BROOM towed behind motor car is used to sweep ballast off ties and rails. Unit was designed and built by NP.

TRAKLINER is used to rough-line the track after each passage of sled.

lines to 8 in on main lines. One might ask why such high raises are being made. The answer to this question lies in the fact that prior to 1941 the NP used processed gravel ballast of various grades.

Gravel was used primarily because of its lower cost and because large supplies were readily accessible. However, the road has concluded that gravel is not too satisfactory for holding track, particularly on heavy-traffic lines. Consequently, a program was begun in 1941 to replace gravel ballast with crushed quarry granite and trap rock.

With the ballast sleds the road feels that it has found an economical means of carrying out its reballasting program. The first raise with the sleds lifts the track out of the old gravel ballast, while the second lift deposits a new layer of crushed rock for the ties to rest on.

An important aspect to the use of the equipment, according to NP officers, is the fact that tie-renewal work can be carried out comparatively easily and cheaply in conjunction with the plowing or sledding operation. While the track is "humped up" by the plow or sled, ties to be removed are knocked loose from the rails with heavy mauls, then pulled out before the track settles back down onto its bed again.

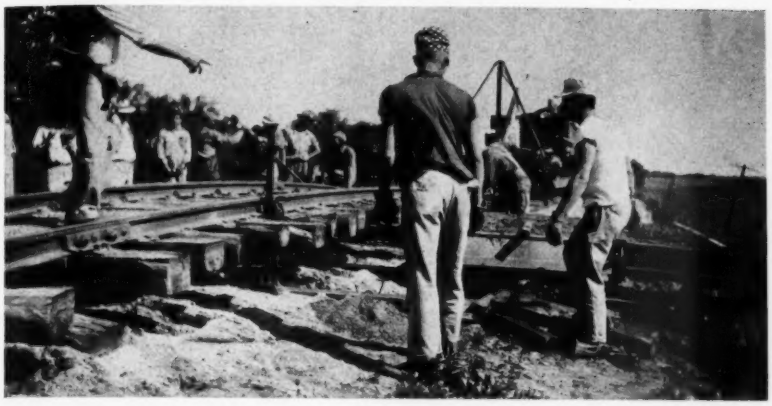
The road's officers also state that the work moves along at a faster clip. Using the sleds, maintenance forces are able to complete the work in about one-third the time required to do the job with hand labor. Thus, interference to revenue trains over a period of time is cut to a minimum. Overall, maintenance officers estimate that the cost of skeletonizing, raising, renewing ties and making a finished surface has been reduced about one-third.

The NP is the first railroad in the United States to make use of the plows and sleds offered by the Mannix concern. However, the equipment has been used at various times on the Canadian railroads for about two years, and is currently in use on other roads in this country. The NP has used two sets of the sleds and plows this year, one for reballasting 47 miles of track and the other for 66 miles.

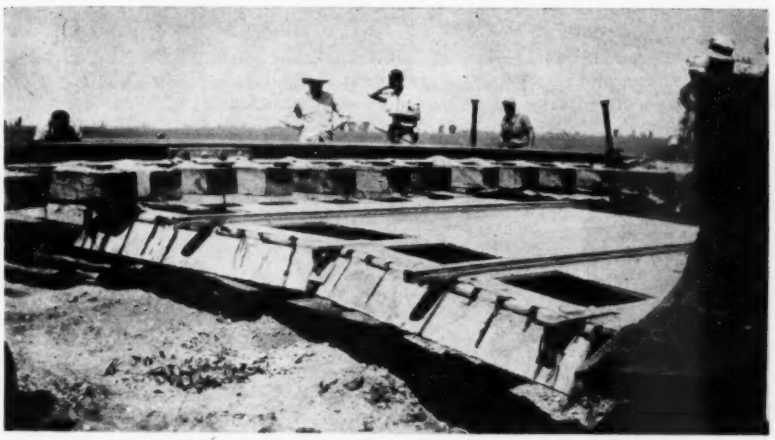
First Use of Sleds

The equipment was first used, beginning March 23, on the Sumas branch of the Tacoma division, about 50 miles north of Seattle, Wash. This job entailed renovating 13 miles of badly fouled track. The track was muddy and, because of heavy rainfall, was wet almost continually. Because of the mud condition, the skeletonizing plow was used first to remove all of the fouled material from the tie cribs. A Jordan Spreader was used to cut down the shoulders ahead of the plow, providing a place for depositing the crib material. A 4-in raise on new ballast was then made

Here's How Sled Is Placed Under Track . . .



JACKS are used to raise track up to point where it will clear sled. Runners are then placed transversely under track so that unit can be . . .



. . . SLID into place under ties by a bulldozer tractor. When removing sled, bulldozer is used to drag unit out from under track after it is jacked up.

with one pass of the ballast sled. A Multiple Tamper and a Trak-liner were then employed to make a 2-in finish raise and line.

Shortly after starting the Sumas Branch job, the other set of equipment was used for a 4.3-mile project on the road's Yellowstone division, about 35 miles west of Glendive, Mont. This project is more representative of the type of work being done with the equipment at most locations. At this point, only the ballast sled was used for raising to skeletonize the track, then for raising on newly unloaded ballast. The plow was not needed since the old ballast was in satisfactory condition for making the initial lift.

Four Miles in Four Days

On the Yellowstone division job the crew was able to raise to skeletonize, renew ties, raise on new material, spot surface and line the 4.3 miles in four days. Except for the work train unloading ballast, the crew worked only 8 hr per day. The first day, 8,950 ft of track was raised to skeletonize and 670 ties were renewed. The sled actually worked 3 hr 37 min. The second day, 12,875 ft were raised to skeletonize and 808 ties were renewed. The sled actually worked 3 hr 55 min.

The third day, the sled was taken back to the starting point to begin the raise on new ballast. On this day a total of 8,950 ft of track was raised on new ballast and the ties straightened up behind. The sled actually worked 2 hr 55 min. On the fourth day, the remaining 12,875 ft were raised on new ballast and all ties straightened. The sled worked only 1 hr 58 min.

The sleds can be moved along at an average of about 1½ miles per hour; however, the tie-renewal work being carried out behind controls the overall speed at which the sled progresses. On this particular job there were no road crossings, switches, or bridges throughout the entire 4.3 miles. Therefore, production was a little higher than could be expected where such obstructions are present. On the average it requires about 45 min to remove the sled from under the track, move it past an obstruction, jack up the track and place the sled under the track again.

A bulldozer-equipped tractor is present on the job at all times for use in pulling out the sled and dragging it back under the track.

Where possible, the tractor pulls the unit along the right of way past the obstruction to a point where it can be reinserted under the track. Otherwise, the sled is pulled up onto ties laid across the track rails, then the ties are slid along the rails to the new starting point. The plow is handled in a similar manner.

To aid in moving the sled or plow past obstructions, Mannix is working on a "stiff leg" arrangement for mounting on the end of the material flat car. The crane will be designed for lifting the sled or plow and for holding it suspended in the air while the car is moved past the obstruction.

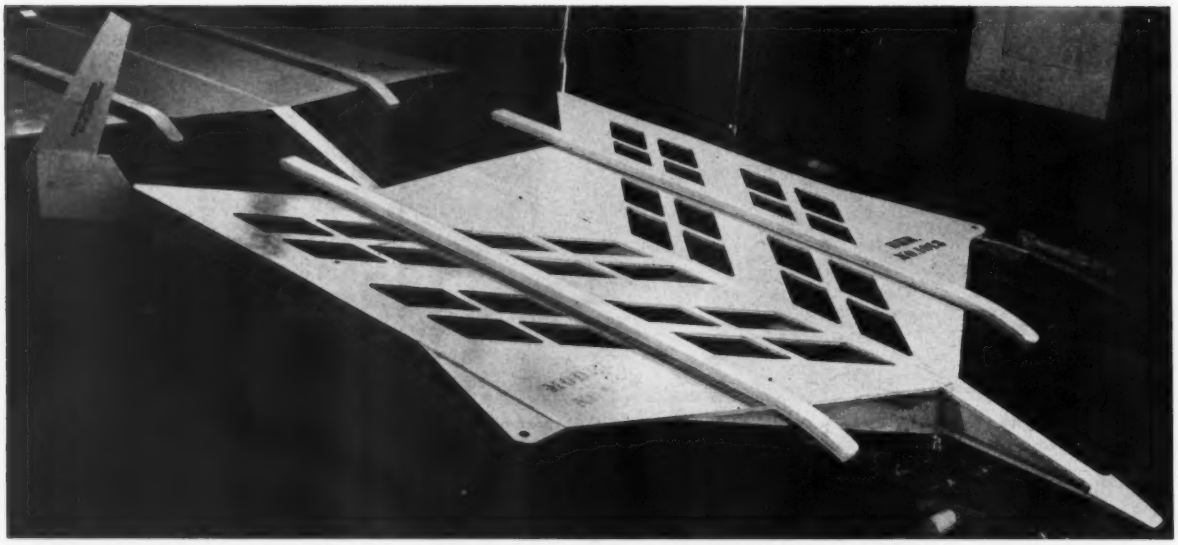
Equipment and Manpower Required

For an average production of one mile of track per day, including plowing out the ballast or raising to skeletonize, renewing ties, raising on new ballast, spot tamping and lining, but not including a finished surface and line, the approximate labor and equipment requirements are as follows:

Two work trains and crews; one bulldozer and operator; one truck and driver to transport supplies; one track-lining machine with an operator, helper and assistant foreman; two flagmen to provide protection for the gang; and two camp tenders. With the sled or plow the NP is using 17 laborers, supervised by the main gang foreman, and one assistant foreman for marking ties to come out. This crew, in addition to assisting in inserting and removing the sled or plow, knocks down and removes old ties. Behind the sled or plow are 49 laborers and one assistant foreman. These men are engaged in removing plates from old ties, inserting new ties in the skeletonized track and spiking and straightening ties.

In working a particular stretch of track where the ballast sled only is being used, the first work train pulls the sled through, making the

For Use When Ballast Is Badly Fouled . . .



SKELETONIZING PLOW is used where it is desirable to waste ballast material in cribs onto shoulders, rather than using ballast for initial raise. Crib material falls through openings, thence is plowed outward by angled blades.

MUDDY TRACK, or track with badly fouled ballast, like this shown here, is usually . . .

. . . SKELETONIZED with plow in order to get rid of fouled material which is not suitable for sub-ballast.

skeletonize raise. As the sled moves along, the crew assigned to the sled knocks down the old ties and removes them, while the crew behind inserts new ties. The track-lining machine is used to make a rough line behind the tie-renewal work. A second work train then follows, unloading new ballast.

The foregoing work is usually carried out for a couple of days, the time depending upon traffic conditions and production, then both work trains and the entire crew fall back to the starting point to begin the raise on new ballast. No. 1 work train pulls the sled through for the second time to make the raise on new ballast.

The track raise is followed by a motor car pulling a specially-designed track sweeper developed specially for this type of work. This outfit cleans ballast off the base of rail and the tops of ties ahead of the track-lining machine which is used again to make a rough line. The liner is followed by No. 2 work train unloading ballast to fill the cribs and for the final raise. Next a surfacing gang makes the final finishing raise using a production tamper. The track sweeper is then used again to clean the rail and tops of ties, and the job is completed by the Trakliner, this time doing the fine lining.

Tie Renewals on 3-Year Cycle

Tie renewals are being made on the basis of the current year's maintenance renewals plus two-year advance renewals. Thus, the road figures that it will be a minimum of three years before the track again needs any kind of attention. Maintenance officers feel that they are able to justify the average loss of about 1½ years of tie life because the renewals are being made so economically.

To avoid train delays to the sledding operations, division maintenance forces work out a schedule with the chief dispatcher on the territory where the work is being done so that revenue trains can be bunched for passing the work location. An attempt is made to run as many trains as possible through at noontime while work is suspended and at off-work hours.

The NP intends to make continued use of the ballast sleds on its main lines in years to come, and plans to use both the plows and sleds on branch lines where fouled ballast conditions exist.

How to Make a Time Study

. . . C of Ga Extra Gang Is "Guinea Pig"

● What can be done to increase production and reduce costs?

In our "efficiency-conscious" age, this question is constantly in the minds of all men of industry, whether it be railroading or the manufacture of chewing gum. The study of time and motion, which enables us to arrive at an index of efficiency, has become a science in itself, far advanced from the days of the "Cheaper By The Dozen" Gilbreths, who pioneered the field.

One such exploration in time and motion was carried out last year on the Central of Georgia. The purpose of this particular study was to determine the variable costs of railway maintenance work and calculate the production efficiencies of a "typical" extra gang working on a "typical" stretch of track.

The study was conducted by the Auburn Research Foundation, the Central of Georgia being selected because of its proximity to the home of the foundation at Auburn, Ala. Kershaw Manufacturing Company was the sponsor of the project. The stretches of track used for the study were between Dadeville, Ala., and Columbus, Ga., with the investigation covering a period of approximately five months between March 1 and September 16, 1954.

The report of the study, somewhat abbreviated, is presented on these pages. In presenting the material, more emphasis is placed on the way in which the study was carried out than on the actual results obtained.—Editor.

The Object

This study was carried out for the purpose of determining the unit costs of work and calculating the production efficiences of Extra Gang No. 1, Central of Georgia, while engaged in surfacing track and renewing ties.

General Information

The principal stretch of track chosen for the study comprised 4.57 miles of track between Milepost S-311, plus 17 rail lengths, and Milepost S-316, minus 44 rail lengths. However, other locations were used for gathering data to complete additional phases of the study. About four miles of track on each side of Camp Hill, Ala., were used for supplementary investigations on tie handling, track surfacing and gang organization.

The initial study of track surfacing was made over a period of five weeks, beginning March 31 and ending May 4, 1954. The work week for the 30-man crew (see Fig. 1 for organization) was 40 hr, divided into four nine-hour days and one four-hour day on Friday. The investigators spent some entire days with the crew in observing and taking notes; usually, however, a spot-check for a certain period of time was the case. The information obtained was recorded on the Auburn Research Foundation Rehabilitation Time Study Reports (see Fig. 2).

After the initial five weeks of intensive data gathering, the information was classified and found incompleted in some respects. It was deemed advisable, therefore, to complete the study during the summer months. Additional data was gathered from July 12 until September 16, 1954, at the extra gang's location near Camp Hill. During this latter period, entire days were spent with the crew, observing the operations and taking notes.

While the gang was under study, the equipment used by it included: One Jackson Multiple Tamper; one Kershaw Ballast Regulator; two motor cars; four push cars; eight Jackson hand tampers; and an assortment of hand tools.

Study Methods Used

The number of laborers was double-checked by actual count and listed on daily reports, as was the time worked each day (see Figs. 2 and 3). The number of trains passing each working day was secured from the division office and spot-checked in the field. The time lost on account of trains was computed empirically on the basis of averages. On a series of days, the time consumed by passing trains during working hours was noted; and, for that particular period, the time spent passing trains was divided by the total number of trains passed to get an average time lost for each passing train. Then for each day, the number of trains passed was multiplied by this average time factor to arrive at "time passing trains" (Item No. 30, Fig. 2). This method was necessary since the actual amount of time spent passing trains could have been found only by full-time field work.

The amount of work done in each 15-min period was obtained, in most of the reports, as a step-by-step compilation with an entry being made in "work completed" columns (Items 1, 9, 42 and 43—Fig. 2) every 15 min. This was obtained directly in the field.

To find at what rate a certain operation could be done, or was usually done, spot time studies were made at intervals. This was the case for finding the time spent handling ties, renewing ties, and tamping with the Multiple Tamper. The progress of the work would be noted at a certain time; then, at a later time the interval and the increase in progress was noted. A nominal average was obtained by averaging several of these spot checks.

Evaluation of Factors

There are two measures of value involved in this study. One is the actual monetary cost per unit of work done (see Fig. 4); the other is the efficiency with which the work was done as measured in production per unit of time (see Fig. 5). However, if the whole picture of the study is to be seen, there are other factors to be considered as background, although they were not directly involved quantitatively.

It must be noted that this work was done with the gang organized according to Central of Georgia

TYPICAL EXTRA-GANG ORGANIZATION - CENTRAL OF GEORGIA RAILROAD			
Job	No. Men	Job	No. Men
Foreman	1	Fill in ballast for tamper	2
Assistant Foreman	1	Nipping ties	2
Flagmen	2	Spiking ties	2
Pulling spikes	1	Removing jacks	2
Run level board	2	Ballast-Regulator operator	1
Operating jacks	1	Ballast-Regulator assistant operators	3
Pulling out old ties	3	Multiple-Tamper operator	1
Cleaning tie bed	3	Multiple-Tamper assistant operator	1
Inserting new ties	2	Average operating force	30

FIG. NO. 1—Labor force for surfacing track and renewing ties. Not included in table, but considered as a part of organization, are two camp cooks.

AUBURN RESEARCH FOUNDATION — Railroad Track — Rehabilitation Time Study Report

Material Handling	Est. No. Laborers	Tr00	15	30	45	45	4r00	15	30	45	5r00	Total Time Hrs. Min.	Work Units	Complete to Mile Post
1. Unload New Ties						6	6							
2. Distribute New Ties														
3. Pick Up New Ties														
4. Pick Up Old Ties														
5. Haul Old Ties to R. R. Car														
6. Load Old Ties														
7. Distribute Spikes														
8. Pick Up Scrap														
9. Unloading Slag					6								4 cars	
RETIMBERING - RESURFACING														
1. Scarify Ballast Shoulder (B.R.)						5	5							
2. Pull Spikes				5	1									
3. Run Level Board				2										
4. Jack or Raise Track														
5. Remove Tie Plates														
6. Pull Old Tie				3	4	3								
7. Cleaning Tie Bed				2	3									
8. Pull In New Tie					2	2								
9. Distributes Spikes, Plates														
10. Place Tie Plate on New Tie														
11. Nip and Spike New Tie														
12. Fill in Ballast for Tamping				1	2	4								
13. Tamping New Tie														
14. Feeding Tamper														
15. Removing Jacks				1	1									
16. Nipping Ties				2	2									
17. Tamping Ties (Multi-Tamper)														
18. Lining Track														
19. Anchor Spiking						3								
20. Plow Ballast From Tie Ends(B.Reg.)														
21. Unload Ballast														
22. Plow Out Ballast (B.Reg.)														
23. Shovel Out Ballast Between Rail														
24. Regulate & Shape Shoulder (B.Reg.)														
25. Moving and Placing Set-Offs														
26. Carrying Material														
27. Fixing Crossing														
28. Set Off and On Tamper														
29. Set Off and On Regulator														
30. Passing Trains														
31. Waiting on Trains				5										
32. Enroute to Job		2	2	2										
33. Stop for Lunch														
34. Pick Up and Store Tools														
35. Flagmen	2													
36. Total Laborers on Job	20													
37. Total Operators on Job	2													
38. Total Foremen on Job	2													
39. Flagmen on Job														
40. J. F. A.														
41. Amount of Raise (inches)														
42. Rail Lengths Surfaced				1	2								39	
43. New Ties Put In													250	

Location S-317 Report No. 25

R.R. Central of Georgia Foreman Tundy

Date Tuesday, May 18, 1954

Weather Fair, Cloudy and Rain

Remarks Copy of original

FIG. NO. 2—These forms are used to establish a pattern of gang organization, showing the number of men working on a particular task at a given time. Any amount of data are available by compilation of values from series of these forms.

standards. This would probably vary on other railroads.

This extra gang did all of its own tie unloading, distributing, and ballast unloading. There is no way to compute exactly how much time goes into handling the ties from the time they are being unloaded until they are inserted in the track since they are almost invariably handled several times.

The amount of time spent handling ties depends, too, upon the method of distribution. Ties were often unloaded directly off a work train along the stretch where renewals were to be made. Sometimes the ties were hauled from a point where they had previously been unloaded in advance of or to the rear of the work area.

The standard amount of track raise used was 3 in. Actual measurements ran from 2¾ in. to 3 1/3 in.

The Ballast Regulator was studied over a period of more than two weeks and it was found that this machine could, during a normal working day, scarify 75 rail lengths of track or dress out 90 rail lengths.

Summary & Conclusions

In appraising this study, many factors stand out in importance because of their direct bearing on the results of the maintenance program. This evaluation is to place them in their proper perspective for analysis of the whole maintenance program as studied.

(1) While working on any stretch of a single track, it must be accepted that there will be delays when surfacing work is halted to pass trains. The duration of these delays depends upon the types of passing trains and their schedules.

(2) It is entirely up to the extra gang foreman to decide when to clear up for a train. The practice is for the foreman to save some minor chores, such as anchor spiking or track lining, to perform after surfacing operations have been stopped for a train. If all manpower is to be utilized, this practice is necessary to provide fill-in work; however, it is possible that it would be profitable to stop all freight trains instead of clearing up for some.

(3) The timbering crew, especially, delays the tamper when a large number of ties are being replaced. Further research could prove whether or not the added efficiency of an enlarged gang would profitably offset the cost of the increased crew.

(4) From time studies on tie-

handling operations, it was found that approximately 0.116 man-hours are required to place a tie in position for the surfacing crew when the tie is hauled in from an unloading point. This is in contrast to the less than 0.03 man-hours required to place a tie in position when it is unloaded directly from the work train, including the small amount of time required to pick up ties left over when more are dropped than are needed.

(5) The amount of the raise has a direct bearing on the speed of the work. The higher the raise, the faster the tie-pulling crew can work; however, if the raise is considerable the Multiple Tamper is unable to tamp the ties with a minimum number of passes without an increased amount of ballast. Some correlation should be worked out to find the ideal track raise for any given set of track conditions.

(6) Figures for unloading slag varied from 1.72 cars per man-hour when only 7 men were so used on September 15 to 0.71 cars per man-hour when 17 men were so used on April 23 (see Fig. 5). A reduction of the slag-unloading force might increase the efficiency of the gang if the men relieved were employed at another task.

(7) One of the controlling factors in computing the time lost by passing trains is the grouping of the trains. When passing trains are about evenly spaced during an average day, the whole surfacing operation must be stopped seven times to clear up for trains. On the other hand, when trains are grouped it is possible to work several hours without interruption by passing several trains at one time. Thus, the factor controlling the time lost passing trains is not necessarily the number of trains, but how they are grouped.

(8) The Ballast Regulator averaged scarifying 75 rail lengths of track per day, or dressing out 90 rail lengths of track per day. According to the manufacturer, this machine is capable of working two miles of track per day, thus indicating that the machine was working not more than 50 per cent of the time.

(9) There is a special problem involved in the type of maintenance work required when the crew must skeletonize track or a road crossing for surfacing. This work is done by hand and is enormously time consuming. If a machine were available to do this type of work, its expense could readily be justified.

MASTER TABLE — CENTRAL OF GEORGIA

	March	April								May	
	31	1	2	5	6	27	28	29	30	3	4
No Laborers (Inc. Flagmen)	22	22	22	22	22	22	22	22	22	22	22
Number Hours Worked	9	9	4	9	9	9	9	9	4	9	9
Number Trains Passed	7	7	8	6	7	6	7	6	2	5	7
All Delays (Hours)	3.72	3.72	1.59	3.19	3.72	3.19	3.72	3.19	1.06	2.65	3.72
Actual Working Time (Hours)	5.28	5.28	2.41	5.81	5.28	5.81	5.28	5.81	2.92	6.35	5.28
Total Actual Working Man-Hours	116	116	53	128	116	128	116	128	64	140	116
No. Foremen	2	2	2	2	2	2	2	2	2	2	2
Number Man-Hours Foremen	18	18	8	18	18	18	18	18	8	18	18
Actual Surfacing Time Foremen	10.56	10.56		11.62	10.56	11.62	10.56	11.62		12.70	10.56
No. Operators (B. Regulat. & M. Tamper)	5	5	5	6	6	6	6	6	6	6	6
No. Man-Hours Operators	45	45	20	54	54	54	54	54	24	54	54
Rail Lengths Surfaced	48	42		42	38	39	45	31		32	50
Track Surfaced (Feet)	1870	1640		1640	1480	1519	1758	1210		1248	1950
Rail Lengths MP Past Mile Post	3311 + 65	+ 107		3312 + 14	+52	+ 72	+117	3313 + 12		3315 +44	+92
Number New Ties Put In	303	274		270	299	166	161	157		233	288
Cars of Ballast Unloaded			13							15	
Tons of Ballast Unloaded (60T/car)			780							900	

FIG. NO. 3—Overall progress of job is recorded on this master table.

COST BREAKDOWN

Individual Costs	Total Cost	Costs Per Mile
1. PERSONNEL		
Labor ($1.457 per hour)	$ 4,686.00	$ 1,028.00
Foremen ($328.12 & $285.12 per month)	521.00	114.00
Operators ($340.62 & $270.32 per month)	1,525.00	334.00
Cooks ($1.457 per hour)	507.00	111.00
Pension and Vacation Pay	724.00	158.00
Total Personnel Cost	$ 7,963.00	$ 1,745.00
2. EQUIPMENT		
Rental of Ballast Regulator ($350.00 per month)	$ 298.00	$ 66.00
Machine operation and maintenance	20.00	4.00
Depreciation of Tamper ($5,336.00 per year)	378.00	82.00
Motor Car depreciation ($440.00 per year)	31.00	7.00
Push Car depreciation ($185.00 per year)	13.00	3.00
Cost of Work Trains ($25.00 per hour)	400.00	88.00
Total Equipment Cost	$ 1,140.00	$ 250.00
3. MATERIAL		
Cost of Ties and Spikes ($3.00)	$10,620.00	$ 2,330.00
Cost of Ballast ($60.00 per car)	3,360.00	737.00
Total Material Cost	$13,980.00	$ 3,067.00
Total All Cost	$23,083.00	$ 5,062.00

TOTAL TRACK SURFACED: 24,100 feet

TOTAL NEW TIES INSERTED: 3,538

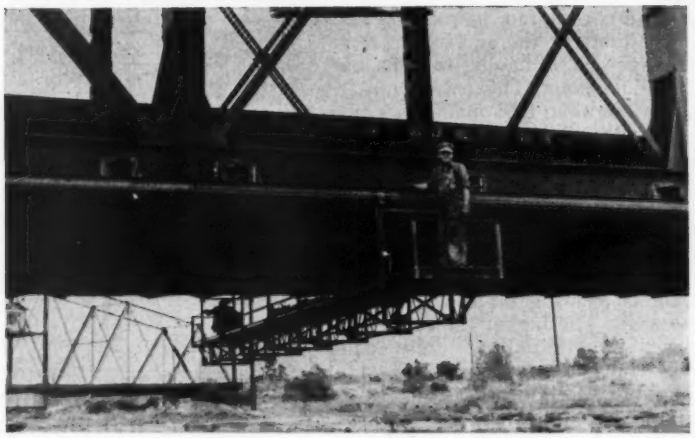
FIG. NO. 4—Costs are broken down into various divisions for easy analysis.

ANALYSIS OF SLAG UNLOADING

Date	Men	Minutes	Man-Hours	Cars Slag Unloaded
April 23	17	60	17	12
September 15	7	70	8.14	14
Cars Per Man-Hour:	April 23 - 0.71		September 15 - 1.72	

FIG. NO. 5—This typical production analysis of a specific operation gives indication of most efficient organization for performing that particular job.

Underneath Trusses . . .



MOVABLE SCAFFOLDS, pulled by two men, permit easy inspection and maintenance of under-floor systems of through-truss or girder spans.

Access Devices on Bridges . . .

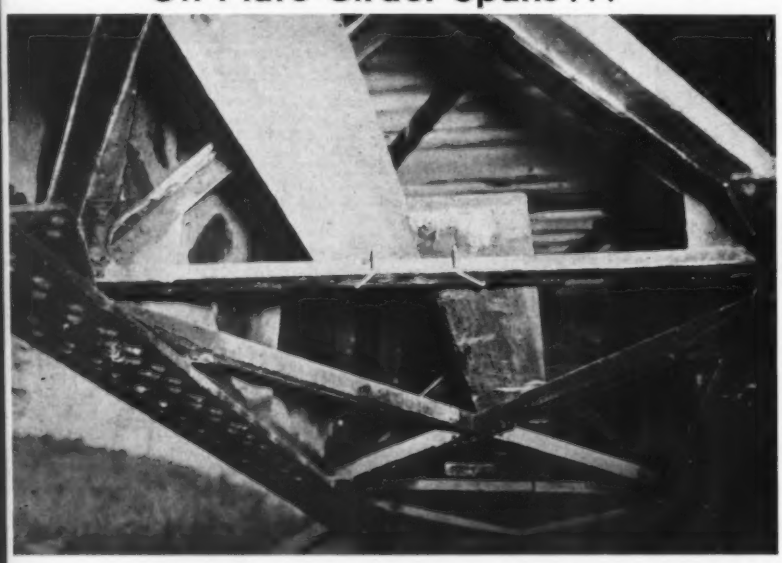
. . . Facilitate Inspection and Maintenance

Many steel bridges on the Santa Fe have been equipped with special devices designed to assist inspectors in quickly and safely observing those parts that would otherwise be more or less inaccessible. An auxiliary feature of these devices is that they reduce the cost of painting and repairing spans.

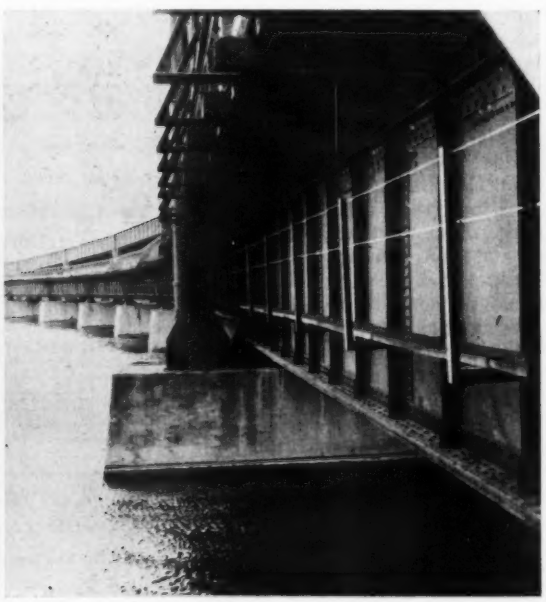
● By providing means of easy access to all parts of many of its bridges, particularly those parts where trouble is most likely to occur, the Santa Fe is assuring that these structures will be thoroughly and adequately inspected. As a by-product of these inspection and maintenance aids it is easier and cheaper to paint and repair the structures, largely because they reduce the amount of scaffolding required.

Perhaps the most interesting of these aids are the travelling scaffolds which are permanently attached to the lower members of truss and long through-plate girder spans with transverse floors. Each of these movable scaffolds consists of a platform of expanded metal or electro-forged-steel grating supported by a pair of Truscon O-T open steel joists spaced about 3 ft apart and cross-braced with angle-iron frames. They are placed transversely under the structure and are made of sufficient length to project from 5 ft to 5 ft 6 in beyond the center line of the trusses or girders

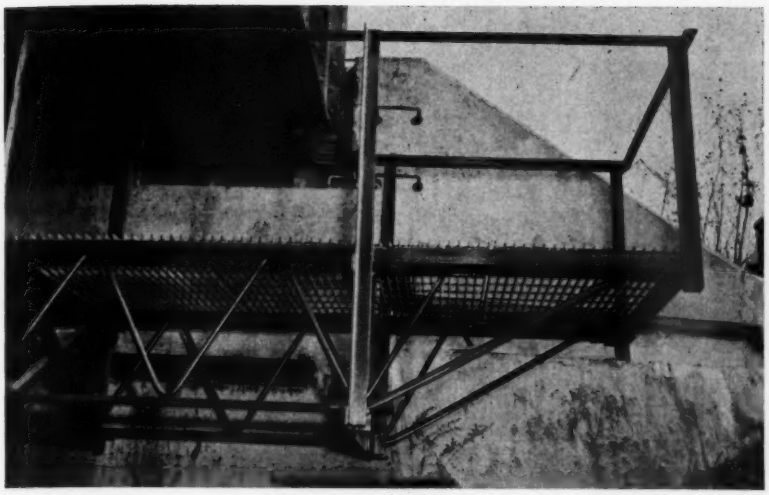
On Plate-Girder Spans . . .



PLANK WALKS supported on lower bracing systems of shallow deck-plate-girder spans are secured to struts with U-bolts.



LONG, DEEP deck-plate-girder spans are equipped with walkways carried on brackets on the outside and . . .



EXPANDED METAL or electro-forged steel grating, supported by Truscon open steel joists, cross-braced with steel-angle frames, forms deck of movable scaffolds.

SCAFFOLD locked at end of span. Note trolley construction. Trolley beam is welded to a short piece of "Z" bar welded to floorbeams of bridge.

at each side. By means of steel angle hangers the scaffold is hung from four 1-ton Yale Whiz trolleys which run along the lower flanges of two parallel 10-lb I-beams attached to the bridge members by welding. The maximum clear working space between the platform and the underside of the bridge is 4 ft 6 in.

All-Welded Scaffolds

For the safety of inspectors and workmen using the movable scaffold, it is completely surrounded with a hand rail of steel angles, which extends 2 ft 6 in above the floor of the scaffold. All joints are welded. A chain and lock are provided at each end so that the scaffold may be secured at one end of the span when not in use. To move the scaffold the men using it pull against the bridge members and two men can easily move it to any location under the span.

These scaffolds permit complete inspection of all joints and connections under a span and allow ready access to all contiguous parts of the structure when painting or making repairs. One of the scaffolds is required for each applicable span of a bridge.

Aids for deck-plate-girder spans are also being provided. In the case of girders less than 8 ft deep a walkway, consisting of a single line of 2-in by 12-in creosoted planks, is laid across the lower struts of the cross frames. The planks are cut to correspond to the strut spacing plus an allowance for a 6-in overhang at each end. They are permanently fastened to the struts with U-bolts.

. . . **INSIDE** of the girders. These brackets are welded to web plates of the girders. Galvanized hand-rail cable is supported 3 ft 6 in above walkway floor.

Walkway Details

Deck-plate-girder spans 80 ft or more in length, or with a height of 8 ft or more back-to-back of the angles, are fitted with walkways on both the inside and the outside of the girders, which are located about 6 ft below the tops of the girders. These walkways consist of a single line of 2-in by 12-in creosoted planks supported by brackets of steel angles, 2 ft long on the inside and 2 ft 6 in long on the outside of the girders, which are welded to the girder web or the stiffener angles. The brackets are spaced about 10 ft apart, and the walkway planks butt together on them, being bolted in place. To provide sufficient bearing for the ends of the abutting planks a short piece of 2½-in by 3-in angle is welded to the vertical leg of the bracket angle with its longer leg outstanding.

These walkways are protected with a handrail of ¼-in galvanized cable located about 3 ft 6 in above the walkway floor. In the intergirder space this handrail is supported by threading it through holes burned in the diagonals of the cross frames. On the outside of the girders the handrail is sup-

At Piers and Abutments . . .

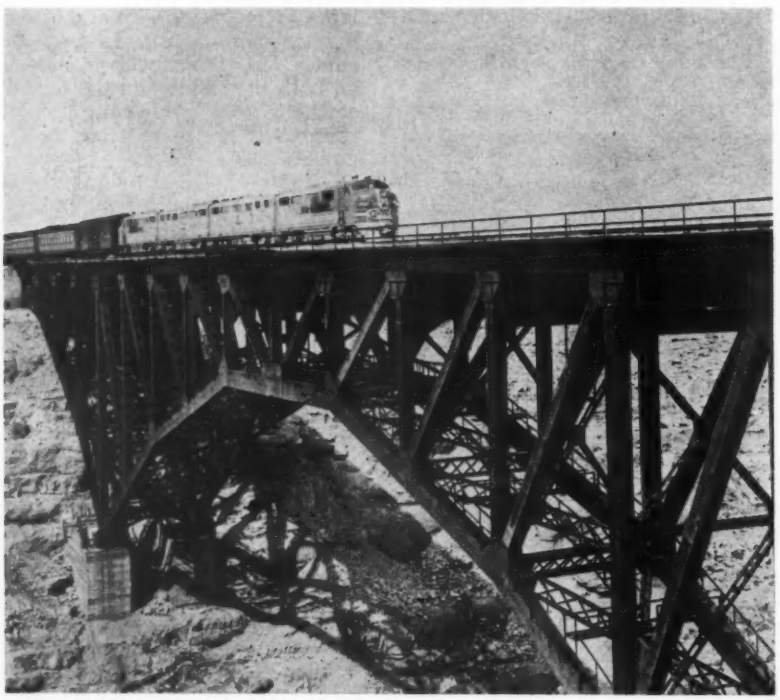
U-BARS welded to end posts and built-up pedestals provide ladders and access to top-lateral systems and bridge seats.

ANGLE supports and U-bar handholds aid inspection and maintenance. This angle was later reset 4 ft below bridge seat.

ported by vertical angles welded to the outer ends of the walkway support brackets.

Another aid being provided on Santa Fe bridges consists of ladder rungs welded to the end posts of through-truss bridges to facilitate climbing to the tops of the trusses for inspecting and maintaining the top lateral systems. Ladder rungs are also being welded to the built-up end pedestals of trusses, where needed, to permit ready access to the tops of bridge piers, precluding the need for using ladders.

At abutments where the parapet walls are high, U-bar ladder steps leading down to the bridge seat are provided. The ends of these bars are grouted into holes drilled into the face of the parapet wall, and a grab iron or hand hold is similarly secured to the top of the parapet. The ladder steps are spaced not to exceed 2 ft apart down the face of the wall.



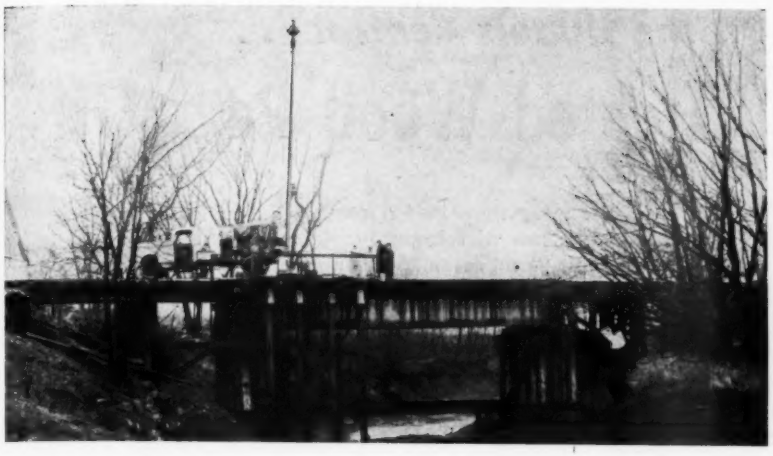
INSPECTION FACILITIES are included in the design of more recent large structures, such as this steel arch over Canyon Diablo in Arizona. These include handrails, access walks, stairways, permanent ladders and catwalks.

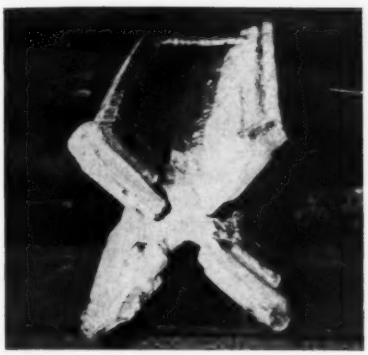
Still another form of aid consists of horizontal angle supports provided for use as footholds at piers and abutments under certain conditions, such as where the distance between low steel and the bridge seat is small; where the pedestals extend to the edge of the abutment or pier; where the low steel of the span is more than 5 ft above dry ground; or where water stands under the span. These supports consist of 5-in by 3½-in by ⅜-in angles which are made 3 ft 6 in longer than the overall width of the span. They are attached to the face of the pier or abutment, generally 3 to 4 ft below the bridge seat, with the 5-in leg outstanding. They are secured to the structures by ¾-in bolts grouted into the face of the abutment or pier. These supports provide footing when inspecting bridge shoes, pedestals and bearings that are otherwise inaccessible or difficult to reach, and permit ready removal of refuse from bridge seats.

These aids are being applied progressively to existing bridges in the order of their importance and need. Similar devices are being incorporated in the design of all applicable new structures.

As a result of these various measures officers of the road report that the quality of bridge inspection and maintenance has improved and the time required to perform the work has been materially reduced.

The work of equipping bridges with these inspection and maintenance facilities is under the general direction of T. A. Blair, chief engineer, and R. A. Van Ness, bridge engineer, Santa Fe System.





TRUCK-MOUNTED drilling rig (above), modified to suit job conditions, was used to handle a . . .

STAR DRILL (left) 6 ft long and weighing 1000 lb, which was hard tipped to resist abrasive action.

STEEL CAISSON (right) being withdrawn from steel bearing pile. Note steel template used to hold caisson vertical during drilling operations.

Piles "Bored" Into Bedrock

Unusual caisson method provides anchorage in rock for steel bearing piles at location where overlying soil is unstable. Holes for the piles were drilled with a truck-mounted rig operating from the deck of the old bridge.

● Some unusual problems were encountered by the Canadian National in rebuilding a bridge located just west of Varennes, Que. This work was done as part of a project for rehabilitating the line between Varennes and St. Lambert in anticipation of iron-ore traffic which is expected to move from shipside, on the St. Lawrence river at Varennes, to the United States by rail.

The old bridge consisted of a 50-ft steel span supported on timber-pile piers. In rebuilding the structure two steel-pile piers were constructed to support the old 50-ft span, and a new steel approach span was added at each end. The shore ends of the approach spans rest on reinforced concrete abutments.

As work on the pile driving progressed, it was discovered that the soil was underlain by a geological fault of sandstone. At the easterly pier and abutment the soil consisted of clay which offered sufficient resistance to stabilize the piles when they had been driven to bedrock.

An entirely different situation existed at the west end of the bridge. Here, the soil over the rock was soft mud, about 10 ft deep, which would provide no lateral stability if the piles were merely driven to rock.

The construction and excavation of a cofferdam and the pouring of concrete to stabilize the piles was ruled out because of the cost. Instead, it was decided to use the "bored-in" caisson method of anchoring the piles.

A steel caisson 19 in in diameter was lowered through the soil until it rested on rock and was then braced by a steel template to stand vertically. A star drill, 6 ft long and weighting 1000 lb, was then operated inside of the pipe to drill a hole 6 ft deep in the rock. The drill was suspended from a truck-mounted drilling rig operating on the deck of the old bridge. Because of the abrasive nature of the sandstone, it was necessary to reface the cutting edge of the drill at intervals during the drilling operations.

After the drilling for each pile had been completed, an H-section steel bearing pile was lowered through the caisson until it rested on a steel plate placed in the bottom of the hole. No-slump concrete was then rammed into the voids which existed around the bearing pile.

After the concrete had hardened the caisson was removed, leaving the pile firmly anchored in the bedrock.

The bridge work on this project was carried out under the general direction of E. J. Napier, bridge engineer, Central Region, of the CNR.

On the Illinois Central . . .

Treated Wood Pays Off

For more than half a century the IC has been observing the performance of treated crossties in test tracks—and is still learning and applying new knowledge about how to make ties last longer. Treated timber trestles are viewed with favor, and the use of treated timber in buildings is increasing. These and other matters are discussed in this article which is based on an address delivered by Mr. Burt before the recent annual convention of the American Wood Preservers Association.

By Clarence S. Burt

Assistant to Vice-President
Purchases and Stores
Illinois Central

● Realizing the need to learn more about the service life of ties of different species of wood, maintenance officers of the Illinois Central authorized the installation of tie test sections during 1909. These sections were spread over the entire system and were located at strategic points so that the effect of varying traffic and climatic conditions might be determined.

These tests were maintained without interruption until World War I, when it became impossible to procure tie dating nails, and resumed in 1926. Since that time every tie inserted in each of the six test sections has been identified through symbols placed on an aluminum tag fastened to the tie with two current year dating nails. The symbol is the key to information with regard to production, seasoning, the preservative used and the method of treatment in each case.

As these ties in these test sections are renewed or replaced, each one is inspected by the manager forest products bureau and the engineer ties and treatment, together with the local division engineer and the supervisor of track. The cause of failure in each instance is determined, and this, with other information pertinent to the service life, is tabulated for record purposes. Through 1954 a total of almost 190,000 such ties have been inspected and reported. About 26.6 per cent were removed because of decay, 48.5 per cent failed because of mechanical wear and 24.9 per cent more were renewed because of defects exceeding AREA specifications and other causes.

The term mechanical wear involved causes of removal such as plate cutting, crushing and spike killed; defects exceeding AREA specifications include splitting and checking and wind shake.

It is significant that of the approximately 30,000 oak ties removed from test sections, 48.8 per cent have failed because of excessive checking and splitting. These records reveal further, with respect to oak, that checking and splitting develop after they are placed in track to the extent necessary to cause replacement, as follows: 1 to 5 years, 0 per cent; 6 to 10 years, 1.1 per cent; 11 to 15 years, 13.5 per cent; 16 to 20 years, 23.1 per cent; after 20 years, 11.1 per cent.

As a result of these continued tests our standard as regards species of wood for best crosstie service performance now involves only three species, namely, southern yellow pine, gum and oak. These experimental sections have also made it possible to evaluate, with respect to species, the better crosstie performance under different climatic conditions. Our findings in this regard clearly indicate that oak shows less checking and splitting when used in the more northern areas of our railroad, with its somewhat less rainfall, whereas gum and pine can better cope with the severe climatic conditions to which ties in the southern portion of the railroad are exposed. Accordingly, our ties are distributed for use on this basis.

Treatment Standards Changed

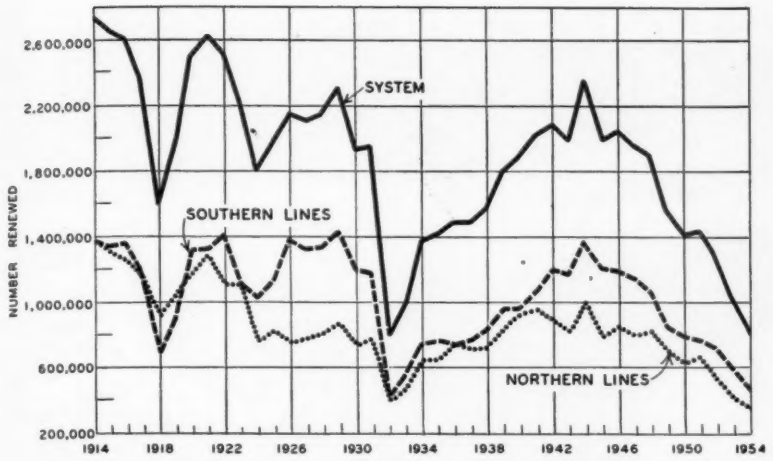
These studies also have brought out the need, through the use of more preservative, of greater protection against early tie failure because of decay. Accordingly, during 1941, our standard, which prior to that time called for the use of 5.5 lb of creosote per cubic foot of wood, was changed to 8 lb per cu ft of 70-30 creosote-coal tar for pine crossties and switch ties and 7 lb per cu ft of the same mixture for oak and gum ties and switch ties.

A further refinement was made in this regard when, on April 1, 1952, the net retention of preservative for gum crossties and switch ties was increased from 7 lb to 9.2 lb of 60-40 creosote-coal tar solution per cubic foot of wood. The 60-40 creosote-coal tar solution then became standard for treatment of all ties and switch ties. On the

A 300-Per Cent Return!

"During 1944, the Illinois Central installed 2,365,739 treated wood ties with a 30-year average life expectancy to 1974. They were installed at a cost of $2.42 each, including material and labor, which brought the total cost to $5,725,988. Had the same number of untreated ties been purchased at that time, the cost would have amounted to $5,204,625. At a 10-year average life, they would need replacement in 1954, and again in 1964. Thus, the total cost if untreated ties had been used during this 30-year period would have been $23,420,816.10. The savings from using treated ties during that year amounted to $17,695,727.72.

"In other words, the expenditure of only 10 per cent more in capital resulted in a saving for the railroad of a little over 300 per cent on the investment. But we all recognize this is not the unusual or phenomenal experience. Rather, it is one that is being duplicated or enlarged on railroads the country over today."



TIE RENEWALS on the IC have fluctuated widely and now appear to be near the bottom of a trough. The Northern and Southern Lines have about the same mileage.

same date the over-all cylinder time was increased sufficiently to accomplish sterilization of the wood through heating in hot preservative. Sterilization is desirable because gum is quite susceptible to infection during damp, wet, or otherwise unfavorable seasoning weather—and this may occur under normal climatic conditions. Incipient decay once started is not generally detected through field inspection.

In my opinion, one of the most progressive steps with regard to improving crosstie performance was taken on the Illinois Central early in 1952. This step was the inauguration of a plan whereby crossties in track are inspected and marked for replacement by a force of inspectors working under the jurisdiction of the engineer of ties and treatment. They accompany section foremen when marking ties for renewal ahead of track gangs where out-of-face surfacing is to be done, or where spot renewals are to be heavy. Results of the practice thus far are gratifying—and we are convinced a material saving in ties and a more uniform tie condition throughout the system will result.

Treated Timber Trestles

Our experience with treated-timber trestles dates back to 1904. It was in that year that the first open-deck trestle constructed with treated timber was built on the railroad. At present there are almost 112 miles of treated timber bridges on the Illinois Central, approximately 75 per cent of which are ballast-deck structures and 25 per cent open-deck bridges.

On the basis of service life and capitalized costs, our people have long since determined in favor of the treated timber bridge over the permanent-type bridge. The findings of our engineering department in this regard are quite convincing. They are summarized in the accompanying tabulation.

Those who are familiar with bridge work will readily recognize that the condition of the piling governs the service life of the structure. Marx Block, engineer of bridges of the Illinois Central, recently commented that the future trend of timber trestles on our road will largely depend on the adequacy of the supply of timber available, comparable economies which may be affected by its use, the quality of timber procured, proper seasoning and the effectiveness of treatment.

What do we see ahead? As far as the Illinois Central is concerned, it will continue to roll over timber trestles constructed largely of high quality southern yellow pine timber treated with Grade I creosote. Our bridge program will include the rebuilding of about 18,000 lin ft of trestle each year for the next five years.

A field in which treated wood has not yet exerted its greatest possible economical influence is that of buildings and other similar uses. In our own case, treated wood is an Illinois Central standard for use in connection with enginehouses, shop buildings, suburban platforms, wharves, cotton platforms, freight platforms, freighthouse platforms, plus sills, joists, beams and girders for small passenger stations and freight stations, roadway buildings and section houses.

One of the last and possibly one of the most vulnerable items added to this list is decking for suburban platforms on the Chicago Terminal. Some of these platforms are a city block long. The use of a preservative with an oil nature for the decks of these platforms brought serious objection because of possible fire hazard. There also was concern that a minimum amount of preservative on the surface of the deck would cause complaints from commuters, especially during hot weather before the preservative had a chance to soak in. The answer was found in good treated yellow pine and gum. Within about five years the replacement of the decking on all these platforms with treated wood will have been accomplished.

Comparative Costs—Wood and Concrete Trestles

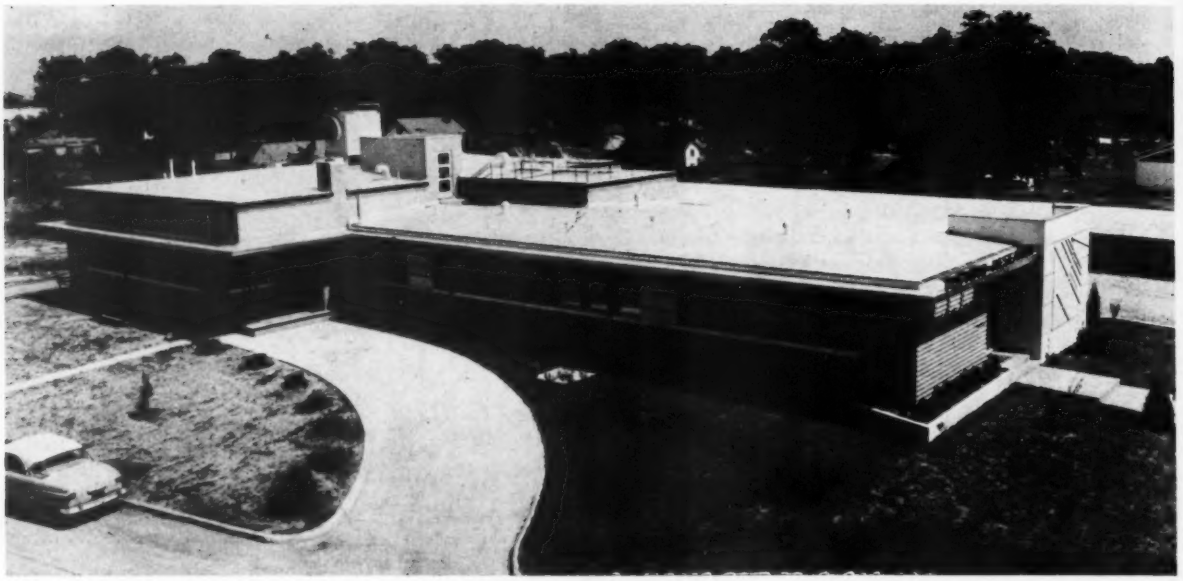
Length: 14 panels (182 lin ft)—Height: 15 ft

Cost to Construct

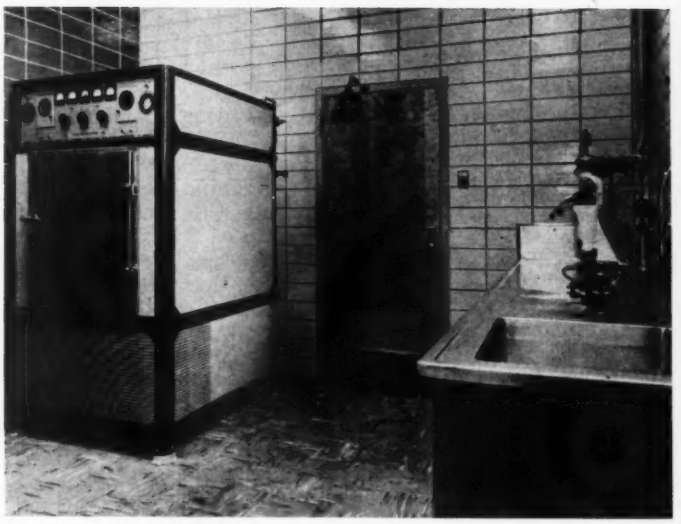
Untreated ballast deck	
Total cost of material and labor, including hardware	$14,500.00
Average cost per lineal foot	79.74
Treated ballast deck	
Total cost of material and labor, including hardware	19,650.00
Average cost per lineal foot	107.96
Concrete pile trestle	
Cost to build now	41,160.27
Average cost per lineal foot	226.16

Cost to Perpetuate

Untreated ballast deck—10-year life		
Initial cost	$ 79.74	per lin ft
Sum of money to be set aside at 5 per cent interest to perpetuate structure in 10 years	126.79	" " "
Total capitalized cost to perpetuate	$ 206.53	" " "
Treated ballast deck—42-year life		
Initial cost	$ 107.96	" " "
Sum of money to be set aside at 5 per cent interest to perpetuate structure in 42 years	15.97	" " "
Total capitalized cost to perpetuate	$ 123.93	" " "
Concrete Pile Trestle—75-year life		
Initial cost	$ 226.16	per lin ft
Sum of money to be set aside at 5 per cent interest to perpetuate structure in 75 years	5.98	" " "
Total capitalized cost to perpetuate	$ 232.14	

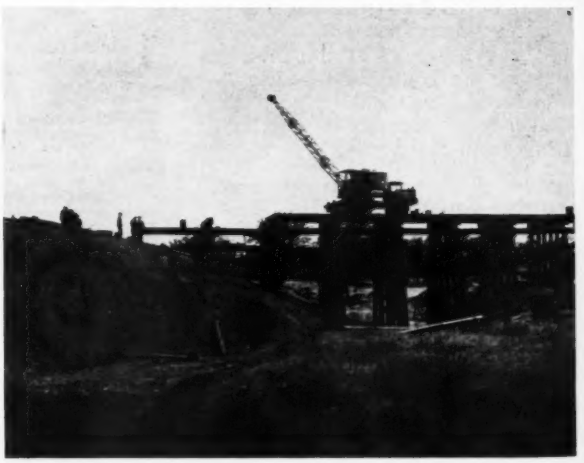


TESTING LABORATORY and research building (above) recently dedicated by the St. Louis-San Francisco at Springfield, Mo. This completely air-conditioned, ultra-modern structure, which cost in excess of $250,000, houses ten laboratories each equipped with the latest developments in testing equipment. Among the more important, these include a protective-coatings laboratory (right), equipped with a Weatherometer for testing paints, and spectrographic, physical and metallographic laboratories.



News Briefs in Pictures . . .

BALLASTING on Santa Fe's new line into Dallas, Tex. Undertrack "sled," towed by work train, places 4 in of ballast under ties on new grade. Broom on track car cleans tops of ties.



BRIDGE WORK on the Dallas line is completed before track is laid. Here, a truck crane is placing timber deck on ballasted-deck pile trestle in advance of track-laying gang.

WHAT'S THE ANSWER? . . .

. . . a forum on track, bridge, building and water service problems

Protecting Freighthouse Doors

When trucks are being spotted at the loading or unloading docks of freighthouses, articles projecting from trucks sometimes damage the freighthouse doors. What are the most effective methods of preventing such damage? Explain.

Provide Continuous Platform

By C. J. Bonnevier
Engineer of Buildings, Chicago, Burlington & Quincy, Chicago

It has been the practice of the CB&Q Railroad to provide a continuous platform along the outside of the trucking doors. This platform may be anywhere from 2½ ft to 4 ft wide with an oak bumper along the outer edge. This provides added clearance so that articles protruding from the rear of the trucks cannot reach the doors.

In the case where articles protruding from the truck are so long that they would reach beyond the safety zone provided by this platform, we suggest that the doors be opened before the truck is backed against the dock.

Provide Posts of Scrap Rail

By J. S. Parsons
Assistant Chief Engineer—Maintenance of Way, Erie, Cleveland, Ohio

Recent changes in the design and construction of truck and trailer bodies have rendered the usual 6-in by 12-in or 8-in by 12-in walers inadequate to properly protect freighthouse doors and door openings by reason of the increased overhang of the truck and trailer bodies. As the result of a study of the problem to determine methods of eliminating continued damage, our maintenance forces were directed to a simple and very satisfactory solution. This involves the installation of scrap-rail posts spiked directly to the waler at points opposite the door jambs. These project 54 in to 58 in above the roadway pavement, so that 12 in to 16 in extends above the floor level of the freighthouse. These rail posts are also securely embedded in concrete in the pavement area. For doorways in excess of 8 ft in width, intermediate rail posts have been installed on about 3-ft centers, with their tops flush with the floor level of the freighthouse. As an alternate to the rail posts, 6-in scrap-pipe posts, filled with concrete, have been used and found entirely satisfactory.

Since installation, these protective barriers have proved completely effective in eliminating damage to the doors and doorways at our freighthouses. By contrast, before installation, continuing damage to the exterior brick work was a constant maintenance expense. In one instance, the necessary repairs to 11 door openings at one freighthouse was estimated to cost about $600 in a single year.

Proper supervision at freighthouses is also necessary to see that truck and trailer doors are securely fastened in either open or closed position when the trucks are backing into position. In the event the freighthouse door is closed, and the trailer door is partially open, very serious damage can result to one or both doors. Those in charge must, of necessity, police this situation to eliminate contributing negligence on the part of those responsible.

It should be noted that considerable damage has also occurred from the inside to doors and door hardware, particularly in the case of overhead doors, at certain freighthouse facilities where power-lift trucks are utilized in handling shipments. Although such damage is due normally to careless operation of such units, cautioning of

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Answers to the following questions are solicited from readers. They should be addressed to the What's the Answer editor, Railway Track and Structures, 79 W. Monroe St., Chicago 3, and reach him at least five (5) weeks in advance of the publication date (the first of the month) of the issue in which they are to appear. An honorarium will be given for each published answer on the basis of its substance and length. Answers will appear with or without the name and title of the author, as may be requested. The editor will also welcome any questions which you may wish to have discussed.

To Be Answered In the November Issue

1. What considerations govern the necessity of pre-curving rail to be laid on curves? Why? What is the best way of pre-curving this rail? Explain.

2. What are the advantages, if any, of "tilt-up" wall construction when compared with conventional construction in railway buildings? Disadvantages? Explain.

3. There are locations where comparatively short stretches of track heave excessively during the winter months and require the installation of long stretches of run-off shims on the approaches. To what extent is it permissible, or good practice, to raise these approaches and maintain shims across the heaving area during the summer months to reduce the amount of run-off shimming required during the winter? What limits, if any, should be placed on the maximum amount of summer shimming? Explain.

4. Does capillary attraction in the wood permit cutoffs of untreated timber foundation piles above water level? If so, how far above high, low or normal water table can untreated piling be cut off and still be safe from decay in silt-type soils? Explain.

5. What causes shrinkage of stone ballast? How much would this amount to in track surfaced out-of-face every three years? Explain.

6. What is the most effective method of removing algae from water to be used in boilers and cooling systems? Explain.

the lift-truck operators has proved relatively ineffective. It was found that very adequate protection can be afforded by installing, immediately adjacent to the door jamb, 4-in or 6-in pipe posts filled with concrete and securely embedded in the concrete floor of the freighthouse. Such posts should project about 4 ft above the floor to prevent the loads on the lift trucks, as well as the lift trucks themselves, striking the door tracks.

Painting of these barriers with yellow paint improves their appearance and gives good visibility under all lighting conditions. Such painting also makes the protective units stand out, and this would appear to have a certain phychological effect on truck drivers and lift-truck operators to the extent that they respect the barriers and use greater care in maneuvering into position for loading or unloading.

Our experience has indicated that the installation costs are more than justified by the elimination of structural damage to the railroad's facilities and the resulting extended service life and proper operation of the freighthouse doors.

Develop Positive Protection

By Engineer of Buildings

Since the advent of motor trucks for the handling of in-and-out movements of lcl freight at the tail-board docks of railway freighthouses, the damage to doors along these docks has constantly increased. This damage has been most serious at the in and outbound delivery doors of the older freight houses. This is because many of these houses were constructed at a time when the major method of haulage was by horse-drawn vehicles.

This condition has developed because of the wide variation in the sizes of the trucks using these facilities, particularly the height from the driveway surface to the truck bed and the length of the overhang behind the rear wheels of the vehicle. Not the least factor also in creating damage is the attitude of the drivers of some of these units and resultant carelessness in operation when spotting for loading and unloading.

The most obvious solution of the problem would seem to be proper policing of the situation to insure that all vehicles are properly backed into the loading or unloading dock. However, such policing is well nigh impossible at the larger terminals because of the number of simultaneous movements underway at a building which may be an eighth to a quarter mile long. Therefore, positive means for such control and protection must be developed.

Perhaps the most effective preventive method is the construction of a platform along the loading edge of the building to replace the waling timbers usually fastened to and along the outer wall of the building at floor height. This platform should be at least 2 ft 6 in wide and should be faced with a substantial waling timber which will act as a bumper. Such an arrangement is eminently satisfactory if the width of the driveway area will permit the reduction. In order that shipments may be protected during inclement weather, a canopy of sufficient height to clear a truck of the maximum height should also extend from the building above and over this platform.

If turning and backing space is restricted, resort may be had to the installation of fenders or bumpers immediately adjacent to and between the door jambs. Such fenders will protect the bearing structure between the door jambs and prevent damage to the building proper in the door area. These fenders should consist of steel H-beams, lengths of rail, or concrete-filled scrap flues or pipe. They should be thoroughly anchored in concrete below the level of the pavement and fastened to the waling timbers along the edge of the freighthouse floor. They should also extend at least 18 in above the level of the freighthouse floor so that they will be of sufficient height to contact the edge of the truck bed no matter what its height above the pavement grade.

Resort has sometimes been taken to lowering of the pavement in the loading or unloading dock area. In this writers opinion, this in reality provides only partial relief because there will always be some trucks high enough to over-run the edge of the platform unless the maximum condition of truck-floor height is met which would then present unsatisfactory loading and unloading conditions for trucks with lower beds.

Elimination of Soft Spots

What is the best time of year to apply treatment for the elimination of soft spots on the roadbed? Why? Explain.

Work During Dry Season

By F. B. Kelly

Roadmaster, Minneapolis, St. Paul & Sault Ste. Marie, Dresser, Wis

A soft spot in the roadbed can be corrected or helped by various methods; i.e., by digging the faulty material out of the roadbed and back filling with gravel, rock, etc.; by adding some new material to the surface of the roadbed; by driving pipes or other drains into the soft spot; by pumping grout into the spot; or by some other measure. To be effective, these methods should be applied at a time of the year when the roadbed is not frozen and is more or less dry. This would seem to be after the rainy time of year and before the freeze-up.

In my territory we have our rainy season in June. After that period has passed it gets dry and there is only light rainfall until the fall rains set in. Sometimes these fall rains fail to materialize and the ground is dry until it freezes. This would be the best time of the year for corrective work.

I imagine most territories have rainy spells followed by drier weather. During this drier time of the year fewer emergencies develop due to the weather, which would halt or stop the work on soft spots. Also, if the roadbed is opened up during the drier time, there is less danger of inclement weather aggravating conditions. Some corrective measures are rather expensive. If they are started in wet weather there may be delays, or the effect of the adverse weather may be to enlarge the spot, with resulting costs that may be greater than the total amount of money allotted.

During the drier time of year, the material that is causing the trouble can be handled better than when it is full of water. Any opening of the roadbed during wet weather allows more moisture to penetrate and would be detrimen-

tal, making more work because of a tendency to enlarge the spot.

Soft spots should be marked out when they develop so that work can be carried out after dry weather has set in. There will then be no question as to where the work is to be done. Summarizing, I would recommend doing the work during the drier time of the year to keep the cost down, to prevent aggravation of the spot and to enable the track forces to keep after the work until completion instead of having to leave it to tend to washouts, etc.

No Hard and Fast Rule

By J. R. Rushmer
Roadway Engineer, System, Atchison, Topeka & Santa Fe, Amarillo, Tex.

There can be no hard and fast rule. Generally speaking, in temperate climates and what might be called normal roadbed material, if the treatment is grouting or construction of drains, the season of the year makes little difference. Under these conditions, advantage can be taken of the use of "year 'round" highly experienced gangs to do the work. This practice also allows 100 per cent use of the necessary work equipment.

Where the roadbed does not freeze deeper than a few inches and does not stay frozen all winter, these types of stabilization work can continue throughout the winter without great loss of efficiency. In very cold climates any type of stabilization work must be done during the warmer months.

There are soils, such as peat, muskeg, etc., that swell in wet weather and shrink in dry weather. With these soils grouting must be done in the drier months in order to get the maximum amount of grout into the roadbed.

Poles and piles may be driven for roadbed stabilization at any time when driving is not too difficult, that is when the roadbed is not deeply frozen or is not so dry that driving is too difficult. The driving of untreated, unseasoned, unpeeled poles, especially, should be done when driving is not too hard. This will avoid delays due to broken poles. Sand piling, also, is more readily done when the roadbed is soft enough for easy driving and pulling of the spuds.

Start After Spring Runoff

By H. M. Tremaine
District Engineer (Retired), Northern Pacific, Spokane, Wash.

The best time to correct soft spots in track is after the completion of the spring runoff and before final winter sets in unless a program is completely set up from final observations made during the previous year. Then, the work may be done at any time winter conditions do not interefere with it.

Soft spots do not always recur with severity or with such regularity as to require attempted control. A record of the soft spots, made by the writer on an operating district over a 25-year period, disclosed a remarkable irregularity in their appearance. Some did not repeat themselves after a few appearances, and others reappeared very intermittently. This fact may be laid to erroneous classification or because the cause was somehow eliminated with the passage of time. Possibly the faulty physical conditions were themselves readjusted. New places of concern occasionally made their appearance.

If the quick removal of slow orders (however intermittent and regardless of duration) is the controlling reason, then the work may be done at any time winter conditions are not too severe.

This answer is made with the understanding that the word "treatment" as used is all-inclusive as to form. There are many methods of correcting soft spots; some, chimerical in appearance, have been found to be successful under certain conditions. The method to be employed should be determined from experience and thorough investigation by competent observers to whom the history of the troublesome spot is accessible.

Municipal Vs. Independent Water Sources

Under what circumstances is it more economical or desirable to secure water for railway use from a municipal rather than from an independent source, such as a well or stream? Why? Explain.

Use Available Public Supply

By L. A. Gillett
Chief Engineer, Virginian, Norfolk, Va.

When this railroad was constructed early in the twentieth century, most of the terminals and towns through which it ran did not have municipal water systems. As a result, it became necessary to supply our needs from natural resources and construct our own systems.

At most of the lesser locations this was accomplished by driving wells, but at our terminals, where consumption was great, rather elaborate construction of reservoirs, dams, pipe lines and pumping equipment was necessary. In some cases these facilities are still in use.

It is my considered opinion, however, that wherever a public supply is readily available it should be used, at least for drinking and washing purposes, since such supplies are controlled by local and state boards of health, in whom lies the responsibility for furnishing safe drinking water at all times.

As far as industrial water is concerned, I have found that, in major cities, it is oftentimes just as economical to purchase water from public sources rather than construct and maintain privately owned water systems. This is not always the case, however, due to the large consumption under steam operation, particularly at terminals.

Under diesel operation, which has just been placed in effect on our railroad, the picture will probably change somewhat due to much lesser needs for water for industrial purposes. We are now making studies to determine the economics of purchasing water from cities at our larger terminals where such an arrangement is not already in effect.

Municipal Water More Expensive

By H. F. Whitmore
Chief Engineer, New York, Chicago & St. Louis, Cleveland

The analysis of the cost of water during the year 1954 from three locations of municipal supply and six locations where water is ob-

tained from rivers or reservoirs, indicated that on the average the cost of the municipal water supply per 1,000 gal was considerably more than that from the independent source. It was noted that, as the quantity used increased, the cost from municipal supply decreased.

The main advantage of municipal supply would be that the water is potable, and therefore possibly requires less piping and further that the supply would be more dependable.

Leakage Through Masonry Arches

What are the most effective methods of stopping or preventing the leakage of water from the roadbed through the barrel of a concrete or masonry arch? Explain.

Seal With Rich Grout

By L. P. Drew
Assistant Chief Engineer, Union Pacific, Omaha

The most effective method of preventing leakage of water through the barrel of either a concrete or masonry arch is to waterproof the outside surface of the arch prior to placing the backfill. This waterproofing should be of the membrane type, using an asphaltic base.

If leakage occurs through an arch already built, one of the most effective methods of stopping water seepage is by pumping a rich grout through holes drilled in the barrel of the arch and into the soil immediately above it so that this soil can be effectively sealed and serve as a barrier against water seepage.

If the concrete in the arch barrel is porous or honeycombed, or the masonry has open joints or disintegrated mortar, grout should be pumped into the voids of the concrete or masonry.

Recommends Pressure Grouting

By A. H. Gustaferro
Railway Representative, Structural & Railways Bureau, Portland Cement Association, Chicago

Since the methods of preventing leakage through the barrel of a new concrete arch are well known and are generally practiced, this discussion will be limited to repairs of existing structures. The method to be used would depend upon the causes and seriousness of the leakage.

As in repairing leaky basements, improved surface drainage may be all that is needed to eliminate or at least reduce leakage. Insofar as possible, the surface should be sloped so that water will drain away from the structure.

Seepage through cracks can sometimes be eliminated by pressure grouting. Holes are first drilled through the barrel at regular intervals. Water is then forced through the holes to clean out channels. A rich grout of about two to three parts fine sand to one part cement is then pumped through the holes until the voids within range are filled. This will be indicated by grout escaping from seams or from other holes. A stiff mortar is then used to seal the holes.

Repairs to subsurface drainage lines and weep holes will sometimes relieve hydrostatic pressure and further reduce leakage.

Spot Surfacing at Rail Joints

When spot-surfacing track, is it good practice to raise the joints higher than the adjoining rail? Why? If so, how much? Explain.

Do Not Hump Joints

By Roadmaster

Spot surfacing of track is a maintenance job which must be carried on continuously if a high standard of riding quality is to be maintained.

It is not a job which can be "overdone" and then left. By this I mean that no part of the running surface should be raised higher than the adjacent track. This includes not only the joints but also the centers and the quarters. Track by its very nature does not settle uniformly, if it did there would be no rough spots to remove. Why then should a track man try to out-guess nature and introduce roughness, reversed from its original state, when correcting conditions of cross level?

Low spots develop because there is less support for the loads which the tie transfers to the ballast at that point than at an adjacent point where surface is maintained. This resistance can be increased only by improving the resistance to tie load. This may be done by increasing the length of tie tamped. It cannot be done by creating a high spot which merely causes greater impacts and increased loads, as well as creating or at least perpetuating the rough spot which was to be corrected.

Poor joint conditions increase the loads from impact at the joints and are frequently the cause of low joints in otherwise good track. When spotting such joints, I instruct my foremen to look first to their condition, making sure that the bolts are tight and the bars are not unduly worn. Then I advise them to raise the joints to proper cross level and increase the distance tamped inside the rail. When this is done low joints when put up usually stay up longer than they otherwise would, and the general track surface is smoother and better maintained.

Level Joints to Adjacent Rail

By Edward Wise, Jr.
Engineer Maintenance of Way, Louisville & Nashville, Louisville, Ky.

We do not believe it to be good practice to raise the joint higher than the adjoining rail. In spot-surfacing track we tamp ties on the outside of the rail, except at joint ties where we also tamp inside the rail a similar distance. In doing this we do not raise the joints higher than the adjoining rail, but depend on the additional tamping of joint ties to hold up the joint.

(*Continued on page* 42)

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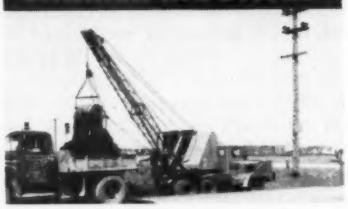

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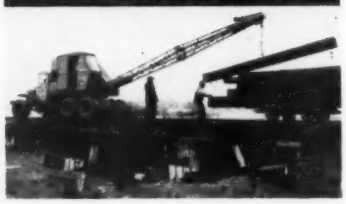

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What's the Answer (Cont'd)

Our joints are built up when necessary by gas welding and the use of reformed joint bars and we find that the above method of spot surfacing produces the best results.

Track Condition Governs

By N. F. Alberts

General Foreman, Chicago, Milwaukee, St. Paul & Pacific, Chicago

Spot surfacing, or sniping track as it is commonly known by trackmen, is one of the most delicate operations in track maintenance since there are a number of factors involved in this work.

Consideration must first be given to the condition of the rail and joints as well as ballast. If bolts are loose, they must be tightened either in advance of spot surfacing or following the raising and tamping of the track. Second, the equipment used to do an effective job of tamping, and the time of the year when this work is being done must be given weight.

Rail and joint conditions, as well as well as ballast conditions, are the joints must not be brought above the adjoining rails and great care should be exercised to see that tamping is done most effectively, and only as required.

The number of ties to be tamped either at joints or at intermediate points must be determined by the foreman or the man in charge of the raising, in advance of the jacking operation. Chalk marks should be placed on the rail to enable the tampers to see just which ties are to be tamped.

Where rail and joint conditions, as well as ballast conditions, are poor, joints must be brought up slightly above the adjoining rails, say from $\frac{3}{16}$ in. to $\frac{1}{4}$ in.

Spot surfacing is usually handled by hand jacks and the foreman or track raiser must use sound judgment in determining where the track jack should be placed.

On double or multiple-track territories it is practical to place the jack under the receiving end of the joint. Tamping preference should be given to the tie supporting the receiving end of the rail. The number of ties to be tamped next to the joint ties rests solely on the judgment of the foreman or man in charge of the track raising.

Where joints are raised above the adjoining rails, shoulder ties

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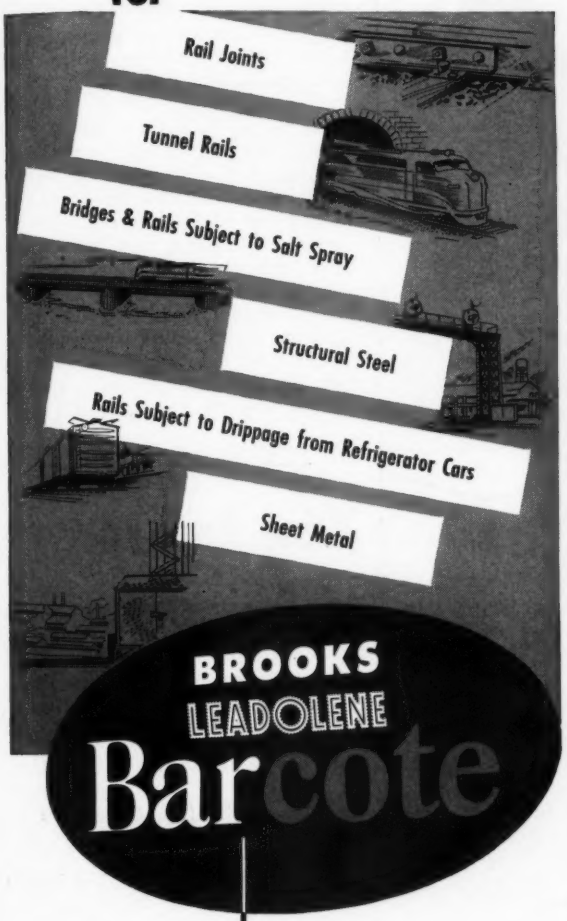

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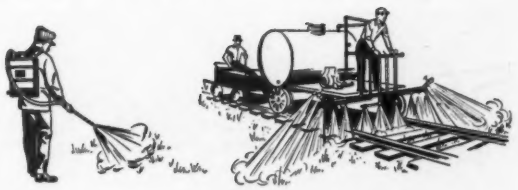

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must not be tamped too solidly, especially shoulder ties supporting the leaving end of the joint. If this matter is not watched closely, humped quarters are likely to result.

Raising joints above the adjoining rail offers a slight disadvantage while carrying cross level when raising the opposite rail. Under these conditions, the level board must not be placed on the joint. It should be placed on a portion of the rail not disturbed by raising operations.

Another method which may be used under these conditions is to spot surface one side of the track one day. Then, allowing traffic to knock down the high joints, level up the opposite side the next day. Track will ride rough for one or two days but will restore itself shortly to proper surface and level.

Wing Rails of Spring Frogs

What causes the wing rails of spring frogs to open during warm weather? How can this tendency be overcome? Explain.

Caused by Rail Creepage

By M. J. ZEEMAN
Engineer Track Design, Atchison, Topeka & Santa Fe, Chicago

The opening of the spring rail in spring-rail frogs during the summer months is primarily caused by rail creepage. Unless the track ahead of the switch, through the turnout proper and beyond the frog is adequately anchored, expansion of the rails runs into the frog. Expansion of rails beyond heel of frog tends

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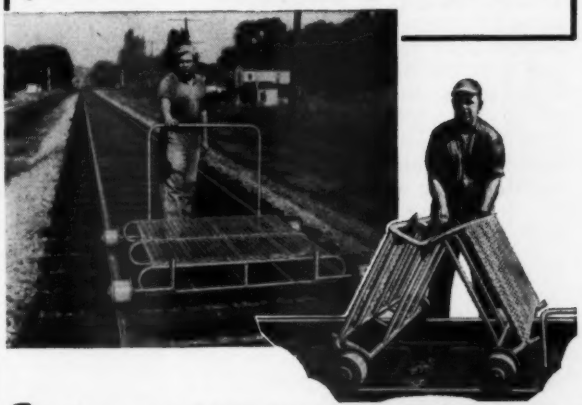

This efficient car is of all-tubular high-carbon steel construction, and designed to safely carry heavy loads of ties, rails, supplies and tools. 2000 lbs. capacity.

The car breaks conveniently in the center into two sections for easy handling and transportation. Easily and quickly unhooked or hooked together. Each section can be used for a truck seat.

The deck is heavy mesh-expanded steel, which prevents slippage of loads. Removable handle can be used at either end. Easily pushed on ball bearing cast steel wheels. Platform size 48" x 45". Height above rail 8". Weight 140 lbs. complete—70 lbs. per section. List price $142.50.

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to move the body of the frog forward, whereas expansion of the straight closure rail tends to move the spring wing rail of the frog in the opposite direction, thus moving the spring rail to the extent permitted by clearance between the bolts and their holes, also by clearance between the horns and holddowns. Expansion of rails at the frog will be aggravated when the heel of switch is bolted through stock rails since the force of expansion of the track ahead of the switch is then added to the expansion of the closure rails.

It seems that hot weather, with correspondingly high rail temperature, has a tendency to straighten out the bends made in the rail. Besides creepage, therefore, there may be additional misfit of the spring rail caused by straightening of the bends in this rail.

Use Proper Track Anchorage

By F. W. CREEDLE
Chief Engineer, Rampo Ajax Division, American Brake Shoe Company, Chicago

Longitudinal movement of the wing rail of a spring frog, or the rigid body of the frog, is a result of traffic and also variations in temperatures of the adjoining rails. This condition is, of course, aggravated in warm weather. It can be overcome by proper track anchorage adjacent to and within the limits of the turnout. At locations where this condition exists, the joint gaps in the rails for a considerable distance from the turnout should be adjusted to normal, the anchors reset and additional anchors applied if necessary.

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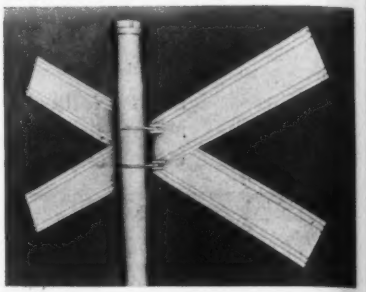

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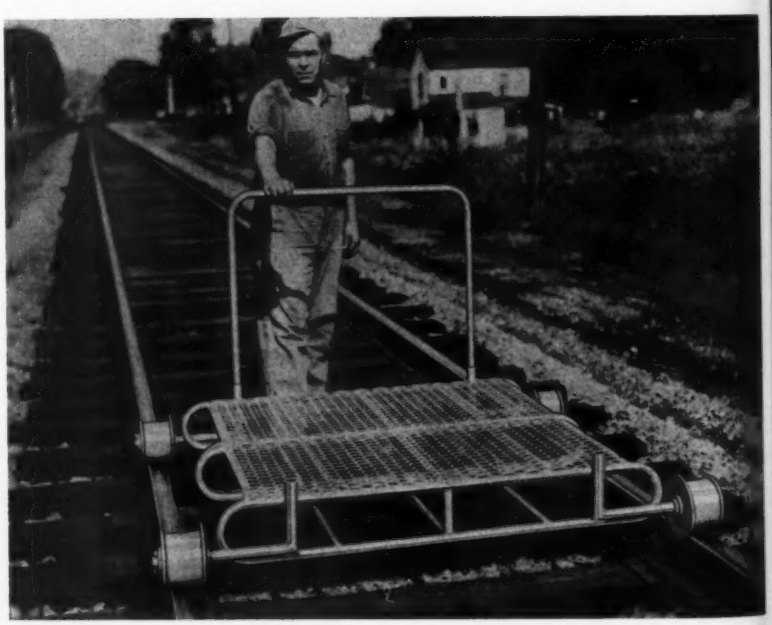
EXTRUDED ALUMINUM CROSSBUCK SIGNS

BACKING MATERIAL of one-piece, extruded-aluminum plate with integral structural stiffners, for use in making reflectorized crossbuck signs, has been announced by the Aluminum Company of America, Pittsburgh, Pa.

Two basic designs of this extruded-aluminum plate are available—one for 4-ft and one for 6-ft crossbucks. The sections are available cut to length and with the mounting holes drilled (⅝-in diameter for ½-in bolts) if so desired. It is reported that the stiffner ribs on the backs of these extruded shapes are so positioned that an even support is given the mounting bolts. It is further reported that the position of these ribs will permit application of the sign on standard pipe supports with the use of Signal Section adapter clamp No. 16477. It is recommended that aluminum or stainless steel bolts be used for application to avoid fastener corrosion.



TOOL AND SUPPLY CAR

TRACK TOOLS and materials, such as ties, rails, track fastenings, etc., can be transported easily along the rails on a new lightweight all-steel push car, announced recently by the Nolan

Company located at Bowerston, Ohio.

Known as the Nolan tool and supply car, the unit weighs 140 lb and has a carrying capacity of 2000 lb. Designed primarily for transporting tools and supplies to the work site from a truck or bus, the car breaks in the center into two sections for easier handling and transportation. The manufacturer reports that the two sections can be easily and quickly hooked together or unhooked and that each section can be used for a truck seat.

Deck of the tool and supply car is of heavy mesh-expanded steel, which aids in preventing slippage of loads.

A handle is supplied for pushing the car. It can be slipped into sockets at either end of the car as desired. The unit is equipped with ball-bearing cast-steel wheels. The platform size is 48 in by 45 in and height above rail is 8 in.

CHAIN SAW CONVERTED TO BRUSH CUTTER

A NEW attachment for converting the Homelite Model 17 chain saw into an all-purpose brush cutter has been announced by the Homelite Corporation, Port Chester, N.Y.

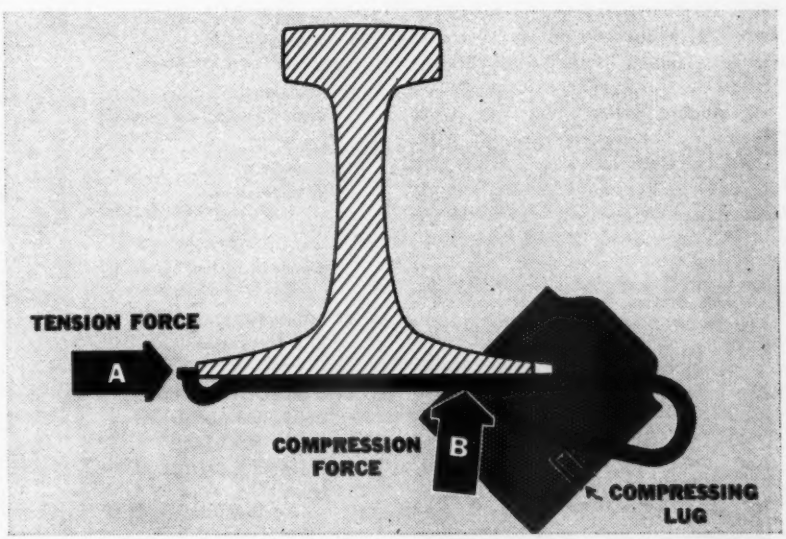
Constructed and powered for continuous use by commercial cutters, the unit has a friction-free flexible shaft which delivers 3.5 hp to the 10-in circular blade. Light weight and balance are said to make the brush cutter an extremely easy-to-operate unit. Hanger and handle bars are adjustable, while a special harness evenly distributes the weight of the entire saw.

A diaphram-type carburetor permits cutting in any position. A 5-ft arm enables the operator to reach low for getting under ovelhanging branches or to reach high for overhead cutting and limbing. The exclusive Homelite saw collar is said to prevent binding by weeds, leaves or twigs.

RAIL ANCHOR WITH TWO-WAY GRIP

A new "Bulldog" rail anchor for which the manufacturer claims 25 per cent greater holding power than for the previous design has been announced by True Temper Corporation, Cleveland, Ohio. As a result of changes made in the design of the anchor, vertical compression has been added to lateral tension, resulting in a two-way grip on the rail.

The new anchor which is similar in basic design to its predecessor, consists of two elements—a double-jawed clamp and a heavy-gauge spring, which are assembled at the factory into a single unit that is said to be easy to apply. The clamp has tapered double jaws which accommodate new or worn rail. The spring is lipped at one end to grip the rail base and looped at the other end to provide continuous spring force to hold the clamp on the rail.



COMBINATION of lateral tension and vertical compression holds the "Bulldog" anchor in place.

Special lugs in the clamp of the new anchor are said to be responsible for increased holding power. These lugs provide a seat for the looped end of the spring. Under the resulting compression the

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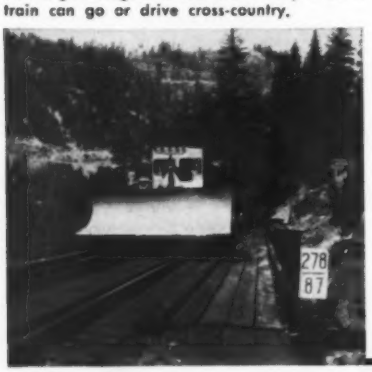

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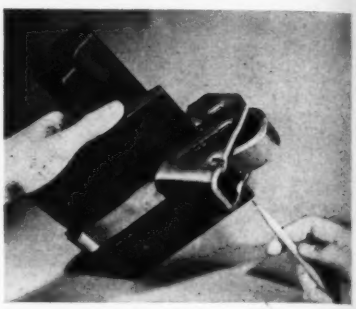
spring is said to exert great upward force. Coupled with the lateral tension which pulls the jaws of the clamp onto the rail base, this force is said to lock the anchor in place with a two-way "squeeze."

The manufacturer cites these additional features which are maintained in the design of the new



SPECIAL LUGS in clamp act against loop, causing spring to be pressed against base of rail.

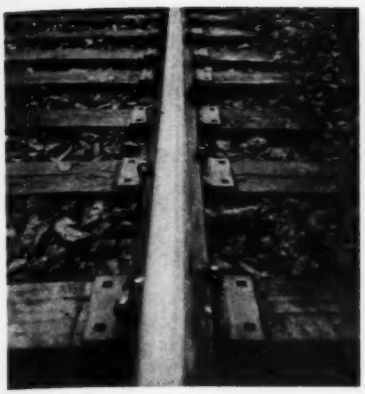
"Bulldog" anchor: (1) Flat tie-bearing surface of the clamp adds to anchor's "staying" power without damaging tie; (2) may be installed by one man using any striking tool; (3) cannot be overdriven—spring absorbs force of heavy blows during installation; (4) not affected by frozen ballast; (5) shipped in 10-anchor bundles for easy handling; (6) does not damage rail in event of derailment.

BUILT-UP ROOF

A NEWLY developed roof specification for decks varying from dead level to low inclines of ½-in per ft has been announced by Johns-Manville, New York City.

Known as Aquadam Built-Up Roofs, the new designs employ a special cementing agent. The roofs built up with asbestos felts will be smooth surfaced, while those built up with rag felts will be gravel surfaced.

The company reports that among cements derived from bitumens such as asphalt or coal-tar pitch, the new Aquadam cement has these outstanding qualities: Greater resistance to cracking and superior self-healing properties; higher adhesiveness for stronger bonding between felts, as well as a firmer holding of gravel; greater resistance to water; and better weathering characteristics.



LOCK SPIKES

TWO TYPES of lock spikes, one for use as line spikes and the other designed for tie-plate hold down, have been announced by the Bernuth, Lembcke Co., Inc., New York. The line spikes are designed for use on tangent track and on light curves. The hold-down spikes are for use at any location where tie-plate anchoring is desired.

The lock spikes are said not only to become integral with the tie plate, but also to bind themselves in the tie by means of lateral pressure of the legs of the spikes against the sides of the tie hole. The spread shank is compressed approximately 1/16 in by the walls of the tie hole with the diverging sides of the head wedged vertically into the tie-plate hole. The tie plates are held against horizontal and vertical movements by spring pressure.

The lock spikes designed for holding line are offset approximately ⅛ in at the tie-plate surface to avoid the lateral thrust and wear from the edge of the rail base. The base of the rail is held by the tie-plate shoulder rather than the spike. A slight clearance is allowed between the top of the rail flange and the spike head to take care of the vertical deflection of the rail.

SWITCH-PLATE LUBRICANT

A GRAPHITE surface conditioner, designed especially for application to switch plates, has been announced by the Ohio Brass Company, Mansfield, Ohio.

The new conditioner is made from highly-refined natural-flake graphite, suspended in a liquid vehicle for ease of application. It has a special resin binder which is claimed to assure close adhesion. Known as Grafett, the mate-

One-man work crew

There are 3 basic reasons why you'll get faster service and reduce your costs per job with this 7-yard D TOURNAPULL

1 You don't need to call out a work crew for scattered maintenance jobs. One man and D Tournapull can be on a job 28 miles away in an hour. Unit takes most direct route... via highway, down or across tracks. It's light enough (24,450 lbs.) to go over almost any bridge... narrow enough (8'3") to safely travel any highway or right-of-way. You can go up to 50 or 100 miles, handle one or more average maintenance assignments, get back the same day.

2 The "D" self-loads in most scraper dirt... needs no pusher or other help to handle small-yardage jobs. For bigger jobs, 2 "D's" with dozer blades can push-load each other. Rig's high speeds make long hauls economical... its speed and short 13' turn radius enable it to outproduce much larger, more expensive crawler-scrapers, even on short hauls.

3 The "D" speeds service year-around. In rainy seasons, it keeps going when other equipment stalls... in snow country, equipped with a 9' V-type plow, it pays winter dividends clearing yards, crossings, and roads. Big tires do not chamfer ties, loosen rails, or trip signals.

Tournapull—Trademark Reg. U.S. Pat. Off. DP-820-RR-z

DP-820-RR-z

FREE..."The Railroad Handyman"

20-page book shows how the 7-yd. self-loading D Tournapull cuts time and costs on right-of-way maintenance. Send coupon for your free copy. No obligation. Also ask to see our color movie, "Clear the Track."

Name ..... Title .....

Division .....

Railroad .....

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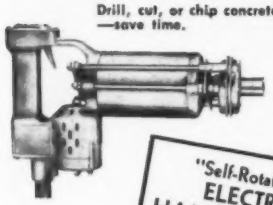
LeTourneau-Westinghouse Company

PEORIA, ILLINOIS

A Subsidiary of Westinghouse Air Brake Company

SYNTRON
POWER TOOLS
. . . cut maintenance time and costs

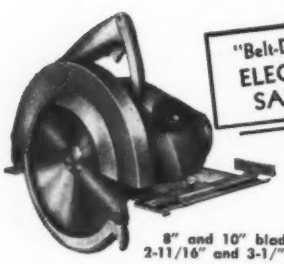
Drill, cut, or chip concrete —save time.



"Self-Rotating" ELECTRIC HAMMER DRILLS AND HAMMERS

Pulsating magnet, electric or gasoline motor driven

CONCRETE VIBRATORS
Mass and Form Types



"Belt-Drive" ELECTRIC SAWS

8" and 10" blades
2-11/16" and 3-1/" cuts

No air compressor needed.

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Paving Breakers
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Spike Drivers

"Self-Contained" DIESEL PILE HAMMERS

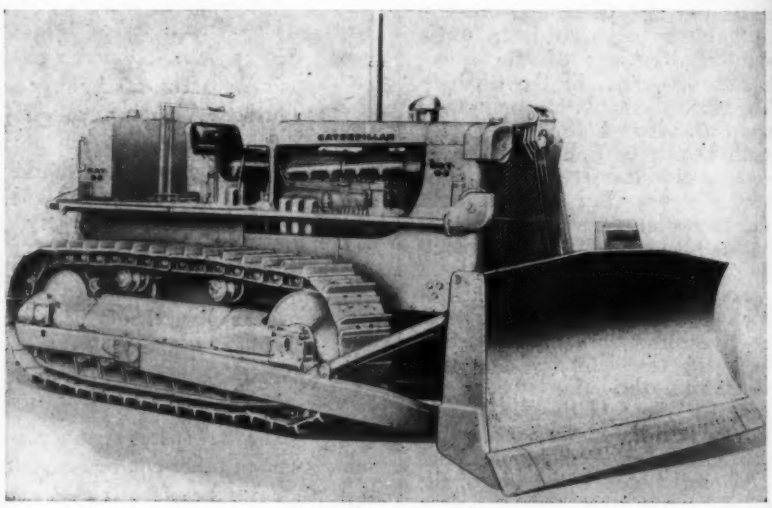
Write today for FREE Tool Catalogue
SYNTRON COMPANY
290 Lexington Avenue
Homer City, Penna.

New Products (Cont'd)

rial reportedly dries quickly into a tack-free film that won't pick up contaminating materials and which is not affected by extremes in temperature, salt brine or heavy rainfall.

To apply Grafett, the surface should first be clean and dry, and before the first application, the plate should be washed with a solvent. Next, the plate surface should be burned with a gasoline or oxyacetylene torch and charred material removed with a wire brush. Plates previously treated with a graphite lubricant ordinarily do not require a complete cleaning before Grafett is applied, only the loose dirt swept away. The manufacturer claims that one coating will last for weeks under normal conditions. Subsequent application of Grafett can be made by just sweeping or brushing plates to remove loose dirt and grit.

For applying the conditioner, a long-handled brush is recommended.



IMPROVED TRACTOR

MANY IMPROVEMENTS have been incorporated into the new Caterpillar D8 tractor according to an announcement by the Caterpillar Tractor Company, Peoria, Ill. The D8 will now be offered in two models, one with a torque-converter drive, which will be known as the Series D, and one with a direct drive, which will be called the Series E. Numerous engineering advancements introduced on the new D8 units are said to make the machine more powerful, faster, easier to operate, easier to service and to provide new modern lines.

In conjunction with the new tractor, matching attachments are also being introduced. These include a rear-mounted double-drum No. 29 cable control, and the front-mounted, single-drum No. 30 cable control. Larger bulldozers with six-part lines for increased lifting power also have been designed for the new units. However, all of the equipment for use with the former D8 is adaptable for use with this improved model.

The Series D model is equipped with a three-stage 5:1 torque converter and provides speeds up to 7.4 mph through a constant-mesh transmission with three speeds for-

1-yd. MICHIGAN takes a heaping bucket-load . . .

The bonus in the bucket pays for this machine fast!

Take another look at the bucket in the photograph. It shows a typical MICHIGAN* bucket-load, heaped-up well over the rated capacity of the bucket—nearly a 50% bonus. Translate this bonus into your daily production and you'll see why a MICHIGAN Tractor Shovel pays for itself fast: you simply move more material with a MICHIGAN.

Tremendous digging ability. Get the bucket blade into hard-to-dig material or under a heavy obstacle and "work" the bucket until you've got a heaping load. The two double acting bucket cylinders are actually powerful enough (if the blade is under an immovable object) to pull the back wheels off the ground! We'll match the MICHIGAN'S digging ability against any make or type of Tractor Shovel, bar none.

Low-level bucket action. You can roll the bucket back only a few inches off the ground—heaping bucket-loads even when the material is scattered only a few inches high. And you can carry the full load *low*—your driver can *see* where he's going, he doesn't have to travel *backwards*.

No clutch—faster cycles. There's no clutch pedal on a MICHIGAN. You can actually shift between Forward and Reverse *while moving:* simply push the hand-lever on the steering column—MICHIGAN'S power-shift transmission shifts instantly. Power-shifting saves time and energy every cycle. Your operators will say: "This sure beats riding a heavy-duty clutch all day!"

See it in action—on your own job. Write us and we'll arrange a demonstration. MICHIGANS are built to handle jobs too tough for other rubber-tired Tractor Shovels—*let us prove it*, without obligation. Write for details on the pay-as-you-go MICHIGAN Lease Plan—you can put these machines to work without laying out a penny of capital.

CLARK EQUIPMENT COMPANY
Construction Machinery Division
492 Second Street
Benton Harbor 27, Michigan
Phone WA 6-6184

CLARK EQUIPMENT

*A Trademark of Clark Equipment Company

ward and three in reverse. The direct drive Series E has five forward speeds and three in reverse, and with the standard transmission provides a speed range from 1.5 to 5.2 mph. Optional transmissions for the Series E will offer job-matched speeds as low as 1.4 mph and as high as 7.2 mph. With the standard transmission, the Series E has a rated drawbar pull of 39,150 lb. The Series D offers over 50,000 lb of drawbar pull.

The newly-designed D8 engine now has 191 hp at 1200 rpm compared to 185 hp at 1200 rpm in the previous model. Drawbar horsepower is now 155. An important feature of the new engine is a "live shaft" drive, independent of the flywheel clutch, which provides constant power for rear-mounted cable controls and the steering-clutch, booster-pump drive.

Among other new features which are said to add to the operating efficiency and serviceability of the new D8 are: New fuel injection system; flanged center main bearing; timing gear integral with crankshaft; nearly all oil lines and valve-push rods located within the engine; a larger capacity oil manifold; and an improved cooling system.

Control levers on the new machine are positioned so as to reduce operator fatigue, and greater steering ease is provided by new hydraulically-boosted steering clutches. New track frames have seven rollers which are reported to improve flotation, traction and stability. With this track arrangement the number of shoes on each side has been increased from 39 to 42, and the life of the track shoes has been increased through a new water-quenched hardening process.

Other design improvements are reported to make the tractor easier to service. Dimensions of the D8 have also been changed. Ground clearance is now 13 in, compared with 10½ in on the predecessor model.

A Burro Crane, its operator and two men on the rail will set a fast pace for the track gang to follow. Rail gangs equipped with a Burro Crane produce more work per shift at lower cost because Burros have the pace-setting speed and efficiency that helps them keep on schedule. Equally efficient with tongs, magnet, hook, bucket or dragline, Burro Cranes handle any job in stride. Fast travel speeds get them to the job in a hurry . . . heavy draw bar pull permits hauling work train and gang.

Only Burro Cranes Have:

- Fast travel speeds . . . up to 22 MPH
- Draw Bar Pull of 7500 lbs. often eliminates need for work train or locomotive
- Elevated Boom Heels for working over high sided gondolas
- Short tail swing — will not foul adjoining track
- Low overall height — a Burro can be worked and loaded on a standard flat car

Write for Bulletins on Burro Cranes

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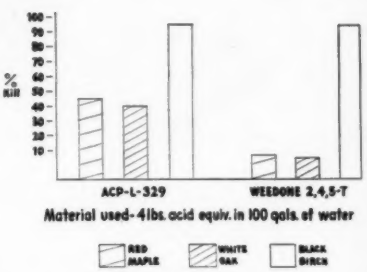


NEW FORMULATION used as foliage spray, gives much better kill on tough species, yet is still as effective on easier-to-kill black birch.

BRUSH KILLER

STANDARD chemicals in a new formulation have been developed by the American Chemical Paint Company, Ambler, Pa., which are said to give excellent killing effects on red maple and white oak. The new formulation, known as ACP-L-329, has been used in tests on the two species, conducted over two growing seasons with kills of 40 and 45 per cent, respectively, after one application of the chemical.

ACP-L-329 can be used either as a foliage or as a basal spray. During the same series of tests black birch was killed by the chemical at a rate of better than 95 per cent. According to the manufacturer, this demonstrates that the new formulation sacrifices none of the effectiveness of standard chemicals, such as Weedone 2,4,5-T, on easy-to-kill species like black birch.

New Increased Power
INTERNATIONAL TD-18A
Now with 103 Drawbar HP

LOOK AT THAT LOAD as operator applies 103-drawbar hp of new TD-18A. Steering is effortless with new hydraulic finger-tip controls and positive, self-energizing brakes.

NEW **Power . . . New gearing . . . New ruggedness —for greater production**

NEW **Track Frames . . . 300 per cent stronger**

NEW **Finger-Tip Power Steering . . . advanced hydraulic design**

NEW **Operator Compartment . . . comfortable driver's seat —easy-to-reach controls**

NEW **Track Roller Oil Seals . . . 500-hour period between lubrications**

NEW **Positive Self-Energizing Brakes, 13% more effective brake area**

NEW **Appearance . . . sleek grille, heavy fenders, 75-gallon fuel tank. Better visibility . . . control-tower view front and rear**

Here's the crawler tractor with everything contractors need to meet increased competition—increased work-power, increased ease of operation, increased durability:

The improved INTERNATIONAL TD-18A, now with 103-drawbar horsepower at 24,300 lbs. maximum drawbar pull in first gear at rated rpm.

Double check all these great new TD-18A features—right here on this page—on your job where you can take over the controls and appraise their value in extra work done for lower cost. Your INTERNATIONAL Industrial Power Distributor will arrange your own personal shake-down test of the TD-18A any time you say.

INTERNATIONAL HARVESTER COMPANY, CHICAGO 1, ILLINOIS

INTERNATIONAL HARVESTER

INTERNATIONAL®
INDUSTRIAL POWER
MAKES EVERY LOAD A PAYLOAD

THE MONTH'S NEWS...

. . . among railway men—the associations—the suppliers

Changes in Railway Personnel

General

R. L. Lamb, transportation inspector on the Chesapeake & Ohio at Richmond, Va., and an engineer through training and experience, has been appointed special engineer—operations at that same point.

J. W. Demcoe, operations assistant on the Canadian National, and an engineer through training and experience, has been appointed general superintendent of the Northern Ontario district with headquarters at North Bay, Ont.

Mr. Demcoe, a native of Kenora, Ont., attended the University of Manitoba where he received a BS degree in civil engineering in 1939. He began his railroad service with the CNR in that same year as a structural draftsman at Toronto, Ont. He served in various engineering positions at Toronto and London, Ont., before being named superintendent of the Hornepayne division in 1951. He became superintendent of the Montreal Terminal and the St. Jerome division in 1953. He was appointed operations assistant in 1954.

L. M. Elledge, division superintendent on the Missouri Pacific and an engineer through training and experience, has been named assistant general manager at Little Rock, Ark.

Mr. Elledge, who was born at Spofford, Tex., December 27, 1901, attended Texas A & M College and began his railroad service with the MP in July 1919. Beginning as a rodman at San Antonio, Tex., he held various positions in the engineering department in and around San Antonio until July 1926 when he became assistant engineer at Palestine, Tex. He was later promoted to division engineer at Houston, subsequently serving in that same capacity at San Antonio until being named trainmaster in January 1943. He became assistant superintendent in early 1952 and was promoted to superintendent in October 1954.

Engineering

H. C. Libby, engineer of bridges on the Eastern Lines of the Southern at Charlotte, N. C., retired May 1 after 46 years of service. As noted in the July issue of *RT&S*, **C. H. Newlin** has been appointed engineer of bridges to succeed Mr. Libby.

R. M. Folk, assistant division engineer on the Southern Pacific, has been named senior assistant division engineer on the Sacramento division with headqaurters at Sacramento, Calif., succeeding **H. J. Willard,** who has been promoted to construction division engineer with headquarters at Ogden, Utah. Mr. Willard will supervise construction work.

J. P. Aaron, office manager, engineering department, on the Western Maryland at Baltimore, Md., has retired after 43 years of service.

N. E. Ekrem, assistant engineer on the Great Northern at St. Paul, Minn., has been promoted to assistant bridge engineer at that same point.

H. B. Christianson, Jr., who has been named assistant chief engineer on the Rock Island at Chicago (*RT&S*, July, pg. 73), began his railroad service with the

H. B. Christianson, Jr

Milwaukee in 1937, working summers and part time at various locations on that road. In 1946 he was appointed instrumentman and began working on a full-time basis. The following year he was promoted to assistant engineer, serving in that capacity until 1949 when he joined the Santa Fe, also as assistant engineer. In April 1954 he left the Santa Fe to become division engineer on the Rock Island at Des Moines, Iowa. Mr. Christianson attended the University of Illinois where he received a BS degree in civil engineering, later attending Northwestern University, the University of Southern California and the Massachusetts Institute of Technology where he received an MS degree in industrial management in 1953.

W. E. Simpson, construction engineer on the Rock Island, has been appointed division engineer at Des Moines, Iowa, succeeding **H. B. Christianson, Jr.,** whose promotion to assistant chief engineer at Chicago was announced in the July issue of *RT&S*. **John F. Marsh,** engineer of bridges at Chicago, has resigned to accept a position in the Virgin Islands.

T. W. Avery, who has been named chief engineer of the Kansas City Terminal at Kansas City (*RT&S*, July pg. 73) was born at Kansas City August 31, 1898. He began his railroad service with the KCT in August 1920 as a draftsman. He later served as instrumentman and assistant engineer before being appointed roadmaster in January 1950. In August 1951 he was promoted to engineer maintenance of way, serving in this capacity until March 1954 when he was appointed assistant chief engineer.

J. T. Evans, whose promotion to division engineer on the Pennsylvania at Cape Charles, Va., was announced recently (*RT&S*, July pg. 75), was born at Scranton, Pa., May 31, 1917. He attended Lehigh University where he received a BS degree in civil engineering in 1939. He began his railroad service with the PRR in August 1940 as an engineer apprentice. He later served as an assistant on the engineering corps and assistant supervisor of track at various locations, before being appointed assistant division engineer at New York in 1952.

E. D. Billmeyer, whose promotion to bridge and structural engineer on the Western Maryland at Baltimore, Md., was announced recently (*RT&S*, July,

E. D. Billmeyer

pg. 74), was born at Cumberland, Md., February 21, 1907. He attended Tri-State College of Engineering where he received a degree in civil engineering in 1928. He began his railroad service with the Pittsburgh & West Virginia in August 1928 as an assistant engineer at

WORKS ALONE AND LIKES IT

Line construction bodies for light to heavy-duty. Crew compartments optional. Efficient tool compartments and drawers.

Bodies for truck driven air compressors. Designed to accommodate hose reels, tapping machines, jack hammers, etc.

Hydraulic derricks designed for front or rear mounting. Capacities to 12,000 lbs.

Mechanical Ladders expertly engineered and counterbalanced for effortless handling. Maximum heights from 23' to 40'. Swings 360°; angles to 72°.

Hydraulic jacks, controlled from rear of truck. Rigid mounted or patented Holan self-stowing types.

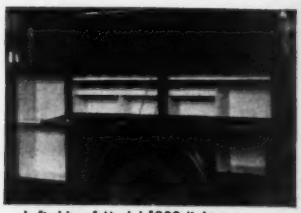
Ladders to 40' with all phases completely hydraulic. Pump actuated by P.T.O. or separate engine drive with electric starter.

Service bodies for chassis up to 1½ ton. Lengths, 75", 84", 90" and 102".

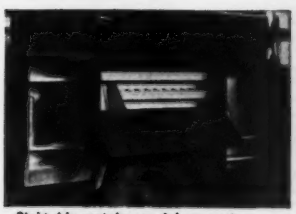
Light-duty power operated derricks for front or rear mounting. Operating range of 146°.

Hydraulic towers with rotary, stationary, or transverse platforms. Exclusive box-girder telescoping mast.

Ready for transporting to the next location the derrick mounts over the cab and the earth borer sets securely in a cradle between A-frame. Jacks are shown in working position.



Left side of Model 1989 light construction body shows ample, well-planned space for tools and equipment. Ladder racks are provided above compartments.



Right side contains special compartment for water cask. Center compartment provides adjustable bins for small parts and tools. Front compartment contains rope hooks.

Almost alone, anyway! For poles up to 40 feet you can put two men to work with Holan's new mighty midget and do a crew-sized day's work!

With digger and derrick front-mounted, the man in the cab can see what he's doing as he controls all digging and lifting operations from inside. The man outside slides front jacks into place, shifts pivot pins in the derrick, guides the earth borer and swings the base of the pole into position. You can detach the digger in a flash and use the powerful HOLAN 4700 hydraulic derrick for lifting transformers and other objects weighing up to 6500 lbs.

HOLAN'S mechanized mole, Model 4401-M Mechanical Earth Borer, quickly hooks up to the P.T.O. drive shaft and is suspended from the derrick to do its work. Completely portable, the borer is lifted and secured into its cradle between the side legs of the derrick.

The HOLAN Model 1989 Body is a light line construction body adaptable to railroad, telephone, R.E.A. and other not-too-heavy electrical work. Typical Holan designing has built efficiency into every last detail from the water cask compartment to special outside shelf for a vise. Pike poles are secured on the right, ladders on the left, in rattle-free, hold-down brackets.

What a big difference the *right* tools make in efficiency, economy and morale. Your new HOLAN 1989 will set new goals for holes and poles! Write for more information today.

"You"-tility Engineered by J. H. HOLAN CORPORATION

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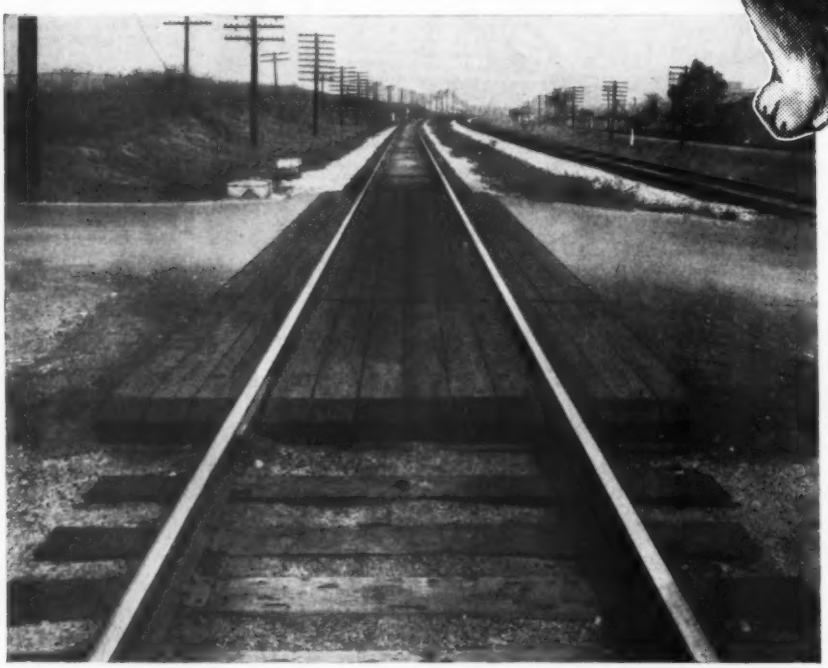
THE NAME THAT MEANS WORK SIMPLIFICATION

PLENTY TOUGH

and ready to prove it!



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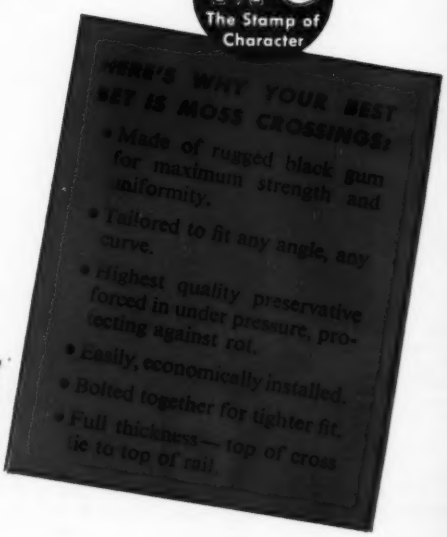
● These Moss Crossings are tough. They're built to take it. Heavy vehicular traffic pounds at them day after day, month after month, year after year, yet many Moss Crossings have been in service fifteen years and more, with very little sign of deterioration. For crossings that are sturdier, more rugged, that render longer service with a minimum of maintenance ...specify Moss Creosoted Black Gum Crossings.

MTC The Stamp of Character


HERE'S WHY YOUR BEST BET IS MOSS CROSSINGS:
• Made of rugged black gum for maximum strength and uniformity.
• Tailored to fit any angle, any curve.
• Highest quality preservative forced in under pressure, protecting against rot.
• Easily, economically installed.
• Bolted together for tighter fit.
• Full thickness—top of cross tie to top of rail.

T. J. MOSS TIE COMPANY

700 SECURITY BUILDING • SAINT LOUIS 2, MISSOURI

Cross Ties • Switch Ties • Lumber • Poles and Posts • Piling • Crossings

WOOD PRESERVING PLANTS: E. St. Louis, Ill.; Granville, Wis.; Shreveport, La.; Columbus, Miss.

Pittsburgh, Pa. In February 1931 he left the railroad to join the Maryland State Road Commission as a bridge inspector, returning to railroad work in January 1947 as an assistant engineer on the Western Maryland at Hagerstown, Md. He served successively as chief draftsman at Baltimore, resident engineer at Cumberland, and office engineer at Baltimore, before being appointed assistant division engineer at Cumberland in May 1949. He was promoted to division engineer at that same point in September 1951, serving there until his recent promotion.

E. M. Skelton, assistant division engineer on the Boston & Albany at Boston, Mass., has been promoted to division engineer with headquarters at South Station, Boston, succeeding **C. M. Gregg,** who has been appointed assistant division engineer on the Eastern division of the parent New York Central with headquarters at Poughkeepsie, N. Y. **J. J. Connors,** supervisor of bridges and buildings at Boston, has been named assistant division engineer at that point to succeed Mr. Skelton.

G. R. Collier, who has been named district engineer on the Gulf, Colorado & Santa Fe at Galveston, Tex. (*RT&S,* July, pg. 73), was born at Colwich, Kan.

G. R. Collier

August 28, 1905. He attended Kansas State College where he received a BS degree in engineering in 1933, beginning his railroad service with the Panhandle & Santa Fe in December 1926. Beginning as a rodman, he subsequently served as an instrumentman, assistant foreman of a rail gang, building inspector and track inspector on new construction before being promoted to roadmaster at San Angelo, Tex., in December 1946. In May 1948 he was appointed general foreman bridges and buildings and water supply at Dodge City, Kan., and in October 1951 was promoted to division engineer, Southern division, at Temple, Tex. Mr. Collier is a veteran of World War II, being released from active duty as a major in anti-aircraft artillery.

A. B. Taylor, construction engineer on the Norfolk Southern at Norfolk, Va., has been promoted to chief engineer at that point, succeeding **M. C. Jennette,** who has resigned. **F. L. Owens,** general roadmaster at Raleigh, N. C., has been appointed superintendent maintenance of way at that same point. The position of general roadmaster has been abolished. **J. B. Davis, Jr.,** office assistant at Norfolk, has been named assistant to chief engineer at that point. The position of office assistant has also been abolished. **J. A. White, Jr.,** has been appointed assistant engineer with headquarters at Norfolk.

R. A. Boerke, who has been named engineer of tests on the Burlington at Aurora, Ill. (*RT&S,* July, pg. 73), was born at Milwaukee, Wis., August 30, 1925. He attended the Illinois Institute of Technology where he received a BS degree in June 1948. He began his railroad service with the CB&Q in April 1949 as a dynamometer car operator, serving in this capacity until being appointed assistant engineer of tests in September 1952.

R. Laymon Mays, assistant to the chief engineer of the Nickel Plate, has been promoted to assistant chief engineer, with headquarters as before at Cleveland, succeeding **C. R. Wright,** who retired June 30, after 49 years of service with this road.

Frank J. Farish assistant division engineer on the Canadian National at Vancouver, B. C., has been promoted to division engineer with headquarters at Winnipeg, Man., succeeding **Edgar S. English** who has been transferred to Montreal as noted in the July issue.

R. B. Wooters, whose promotion to division engineer on the Western Maryland at Cumberland, Md., was announced recently (*RT&S,* July, pg. 74),

R. B. Wooters

was born at Clarksburg, W. Va., December 27, 1921. He attended New York University where he received an AB degree in geology in 1943 and West Virginia University where he received a BS degree and an MS degree in civil engineering in 1949 and 1950, respectively. He began his railroad service with the WM in June of 1952 as an assistant engineer in the office of the chief engineer at Baltimore. Prior to that Mr. Wooters served as assistant chief engineer for the Barnes Dawson Coal Company at Clarksburg and as an instructor in the department of civil engineering at West Virginia University. In November 1953, he was promoted to senior assistant engineer on the Western Maryland, holding this position until his recent promotion. Mr. Wooters is a veteran of military service with the Corps of Engineers during both World War II and the Korean War. He holds the rank of captain.

Track

R. A. Shaw, assistant supervisor of track on the Pennsylvania at New Brunswick, N. J., has been appointed supervisor of track at Cape Charles, Va., succeeding **C. G. Knight,** who has been transferred to Terre Haute, Ind. **J. M. Course,** has been appointed assistant supervisor of track at New Brunswick, succeeding Mr. Shaw. **L. E. Ward,** supervisor of track at Terre Haute, has been transferred to Chicago to replace **J. J. Baffa,** whose promotion to assistant division engineer at New York was announced in the July issue of *RT&S.* **T. T. Connelly,** assistant supervisor of track at Washington, D. C., has been promoted to supervisor of track at Alliance, Ohio, succeeding **D. N. Worfel,** who has been transferred to Dayton, Ohio. Mr. Worfel replaces **C. W. Owen,** transferred to Johnstown, Pa., to replace **J. W. Diffenderfer,** whose promotion to assistant division engineer was announced in the July issue of *RT&S.* **W. G. Lillis** has been appointed assistant supervisor of track at Williamsport, Pa., and **G. H. Way** has been advanced to assistant supervisor of track at York, Pa.

Mr. Shaw was born at Leaksville, N. C., July 21, 1927. He attended North Carolina State College from 1946 to 1950, and began his railroad service with the Pennsylvania in June 1950 as a junior engineer at Northumberland, Pa. In December 1951 he was promoted to assistant supervisor track (branch line) at Jamesburg, N. J. He was appointed assistant supervisor of track (main line) at New Brunswick in February 1952.

Mr. Connelly was born May 26, 1928, at Hopewell, Va. He attended Virginia Polytechnic Institute where he received a BS degree in civil engineering in 1949, beginning his railroad service with the PRR in July 1949 as a junior engineer of track at Wellsville, Ohio. He subsequently served in this same capacity at Pittsburgh, Pa., and Dennison, Ohio, until being appointed assistant supervisor of track at York, Pa., in December 1951. He later served in the same capacity at Washington, D. C., between September 1952 and April 1955.

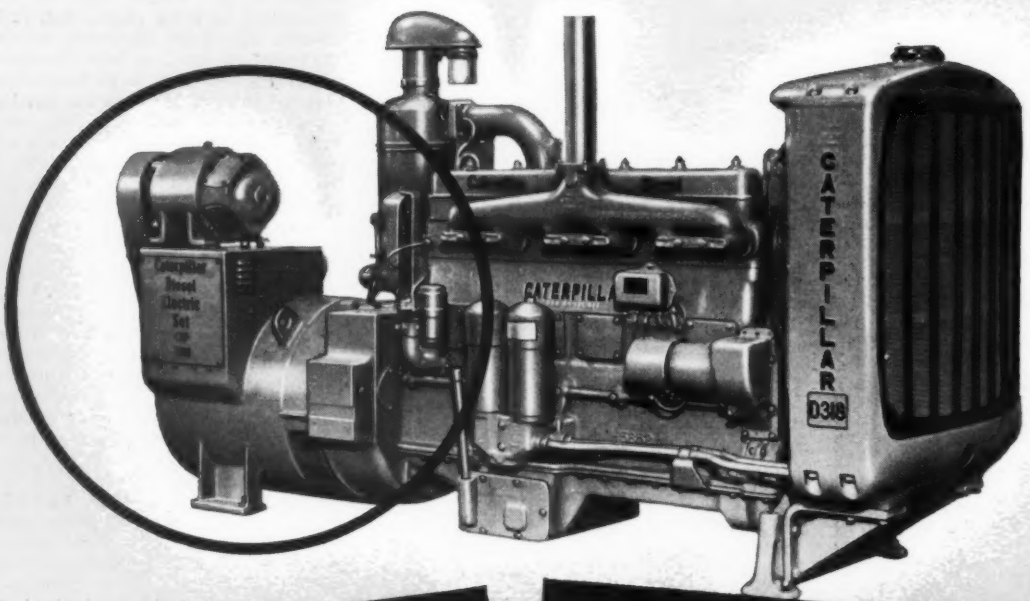
N. B. Galyon has been appointed assistant track supervisor on the Southern at Chattanooga, Tenn.

L. E. Hobbs, student supervisor on the Frisco at Tulsa, Okla., has been promoted to assistant roadmaster on the 50th track division with headquarters at Kansas City, Mo.

T. J. Feidler, assistant roadmaster on the Chicago & North Western at Chi-

(Continued on page 60)

The NEW
CATERPILLAR
...A major development in

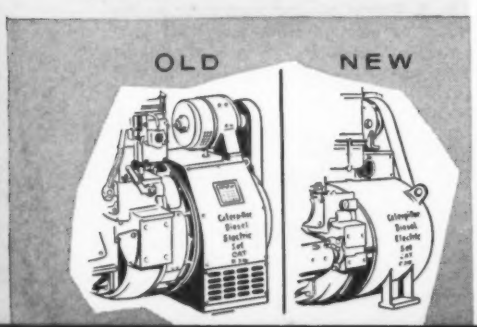


Nothing like it for simple operation, flexible application, compact power, rugged construction, long life and ease of maintenance.

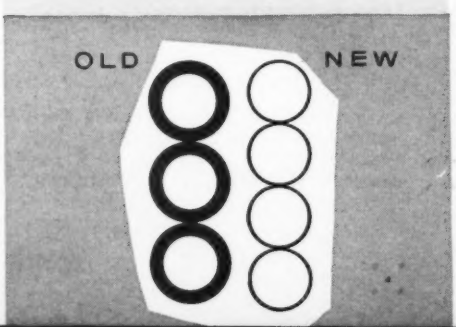
Heart of the new line of Cat Diesel Electric Sets, providing in one package the best features of self-regulated and externally-regulated generator plants—you get more for your money.

Easily paralleled with other generators now in use.

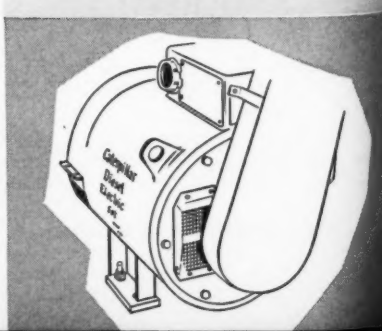
There is a big difference in size between the old and new Caterpillar Generators.



New insulation permits more compact design—exaggerated comparison in illustration below.



New design saves space. Leads can be taken from side, back or top without affecting machine width.



GENERATOR

modern electric power

MAJOR ADVANTAGES OF THE NEW CAT GENERATORS

1 **MATCHED TO ENGINE PERFORMANCE.** Each Cat Generator is designed and built to exactly match the Cat Engine powering it, assuring maximum efficiency in a simple, complete package.

2 **SELF-REGULATING, WITH CLOSE VOLTAGE REGULATION.** Designed to meet the needs of applications now served by self-regulated or externally-regulated generators, this new generator provides steady voltage from no load to full load.

3 **ADJUSTABLE FOR SPECIAL CONDITIONS.** During initial installation, the terminal voltage and voltage "droop" can be adjusted to meet the special conditions of the application. After that, the adjustments are locked and no further adjustments are necessary.

4 **EASY TO INSTALL.** No complicated switchgear or external voltage regulators are needed.

5 **VERSATILE IN APPLICATION.** Easily paralleled with other generators now in use.

6 **SMALL AND COMPACT.** Occupy less space than other generators. A reduction in frame size, close coupling, top-mounted exciter results in a shorter over-all package length.

7 **BIG ELECTRICALLY.** Motor starting ability—capacity to handle the surge of heavy loads.

8 **EASY TO MAINTAIN.** Heavy-duty, single-bearing, close-coupled construction. The single bearing is easily accessible and is lubricated from an oil reservoir that requires filling only once a year.

9 **RUGGEDLY CONSTRUCTED.** Heavy-duty, laminated pole rotor for improved operation and increased rotor life.

10 **DESIGNED FOR LONG LIFE.** Built to match the long life of the Caterpillar Engine powering them.

Another example of Caterpillar leadership in action!

In 1939, Caterpillar introduced the first Cat* self-regulated Electric Set.

Like most new developments, it had to win acceptance against "old, hidebound, traditional practices and prejudices."

It won acceptance—quickly and with outstanding success.

Now Caterpillar introduces another new concept in diesel-electric power—a new and better generator.

Combining the latest developments in design, materials and production, it gives Caterpillar's new line of Diesel Electric Sets the efficiency of the externally-regulated generator in a self-regulated set. And you get more for your money.

These power packages are 100% backed by Caterpillar and sold and serviced by one reliable source—your nearby Caterpillar Dealer.

Whatever your power requirements, it will pay you to look into the new Cat Diesel Electric Sets with their new advance-design generators. See your Caterpillar Dealer about them today!

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CATERPILLAR*

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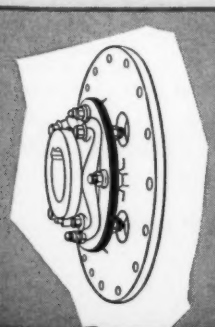
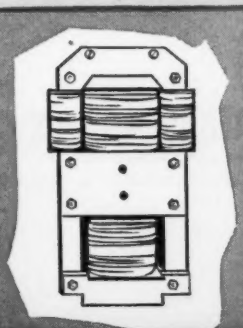
NEW HEAVY-DUTY ELECTRIC SETS

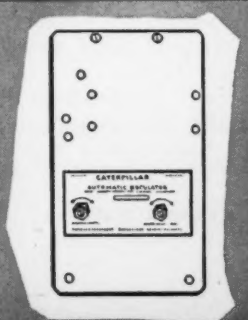
Disc-type coupling and single-bearing design save space. Single bearing is easily accessible.



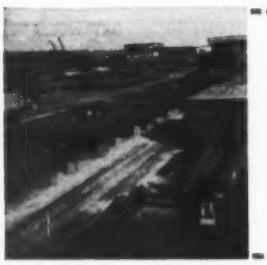
The "regulator" of the new Caterpillar Generator. No moving parts — compact — reliable.



The control panel—adjustments locked at installation. No further attention required.



Where ground must be kept **BARE** *of weeds and grasses...*



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DIVISION OF BORAX CONSOLIDATED, LIMITED
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Railway Personnel (Cont'd)

(Continued from page 57)

cago, has been promoted to roadmaster at Ames, Iowa, succeeding **T. F. Fox,** who has been transferred to Fond du Lac, Wis.

M. L. Denton, Jr., assistant track supervisor on the Southern at Richmond, Va., who has been on furlough to the military service since June 1953, has been appointed track supervisor at Batesburg, S. C.

A native of Charlotte County, Va., Mr. Denton was born on February 19, 1930. He began his railroad service with the Southern as a section laborer at Richmond in June 1947. He was later promoted to apprentice foreman and section foreman before becoming assistant track supervisor at Richmond in August 1952.

Bridge and Building

E. K. Ratliff, track supervisor on the Southern at Batesburg, S. C., has been named B&B supervisor at Alexandria, Va., succeeding **C. B. Foster.**

L. C. Winkelhaus, assistant architectural engineer of the Chicago & North Western at Chicago, and formerly architectural engineer, has retired.

J. E. Christian, carpenter on the Chesapeake & Ohio at Rainelle, W. Va., has been appointed assistant supervisor bridges & buildings and water supply at that same point. **R. H. Reid,** instrumentman at Huntington, W. Va., has been promoted to assistant supervisor bridges and buildings at Peru, Ind.

Water Service

D. C. Teal, superintendent water supply on the Southern Region of the Chesapeake & Ohio at Richmond, Va., has been named superintendent water supply-system at that point.

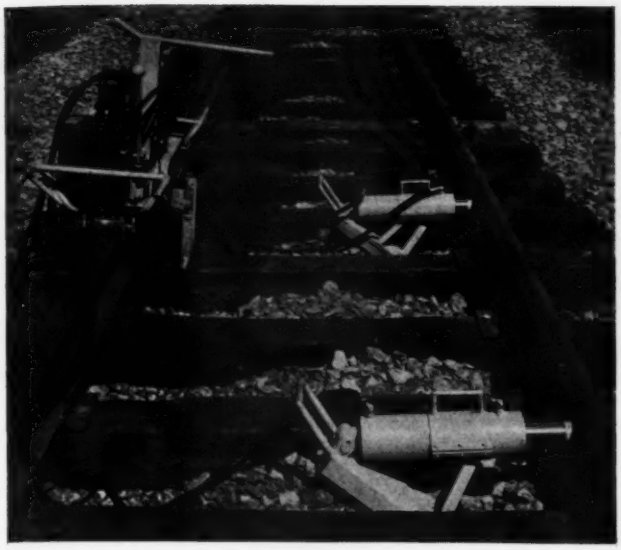
Special

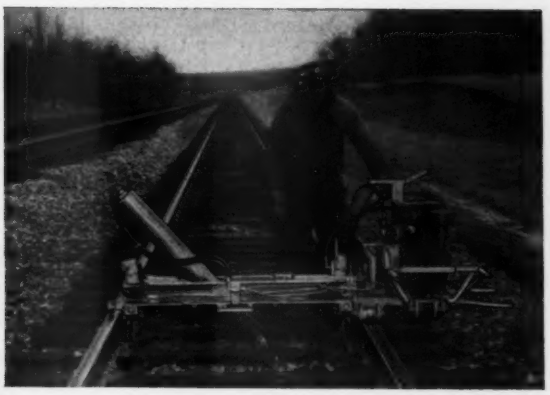
L. C. Collister, superintendent treating plant on the Santa Fe at Albuquerque, N. M., has been promoted to manager treating plants at Topeka, Kan., succeeding **D. J. Murray,** who has retired.

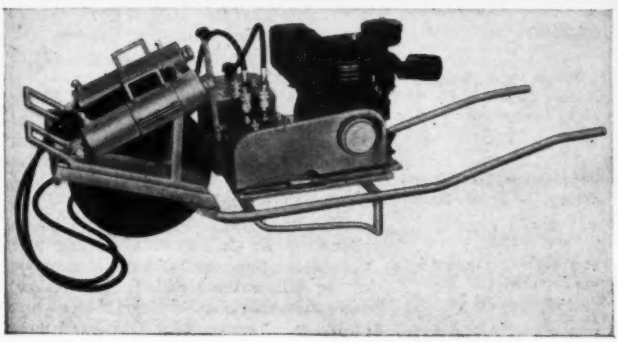
C. C. Jacobson, designer in the building department of the Illinois Central at Chicago, has been appointed superintendent scales at Centralia, Ill., succeeding **W. E. Schlinkert.**

J. W. Hollingsworth has been appointed industrial engineer on the Bessemer & Lake Erie at Greensville, Pa., succeeding **H. R. Morris,** who has been promoted to chief industrial engineer.

Paul Martin, superintendent work equipment on the Denver & Rio Grande Western at Denver, Colo., has been







Upper left—Model P-O, gasoline engine powered Hydraulic Track Liner operating two hydraulic rams.

Upper right—Model P-O gasoline engine powered Hydraulic Track Liner operating attachment with double flanged track rollers, adjustable for any height and weight of rail.

Lower left—Model P-O gasoline engine powered Hydraulic Track Liner and two hydraulic rams mounted on wheelbarrow type frame that can easily be operated or transported by one man.

Lower right—Model H-O Hydraulic pump, light weight, hand operated, that will supply power for one (as shown) or two rams. Ideal for small gangs.

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This equipment is also available mounted on a wheelbarrow type frame that can be transported by one man for use in heavy traffic areas.

The hand operated hydraulic pump, available with either one or two hydraulic rams, is ideal for spot lining with small gangs.

The interchangeable units of these highly portable power operated Hydraulic Track Liner combinations afford a smaller force, the equipment necessary to do the work that normally would require heavier oversized machines and a large crew.

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appointed superintendent of maintenance equipment on the New York Central, with headquarters at Cleveland, Ohio, succeeding **J. C. Ryan,** who has retired after more than 32 years of service. Mr. Ryan's appointment as vice-president of Matisa Equipment Corporation is noted elsewhere in these columns.

Obituary

Walter R. Prass, retired bridge engineer on the Burlington, died June 23 at the age of 65.

Association News

Roadmasters' Association; Bridge & Building Association

Programs are nearing completion for the concurrent annual conventions of the Roadmasters and Maintenance of Way Association and the American Railway Bridge & Building Association, to be held at the Conrad Hilton Hotel, Chicago, September, 19-21. The two meetings will convene in a joint opening session on Monday, September 19, in the Williford Room on the third floor of the hotel. This session will be featured by addresses of two top-ranking railway officers. One of these will be J. P. Kiley, president, Milwaukee Road, who will speak on "What Management Expects from Maintenance of Way Officers." The other will be M. M. Cronk, vice-president (staff), Chesapeake & Ohio, whose subject had not been announced at press time.

Immediately after lunch on Monday, the two groups will begin their separate sessions, but will have another joint session on Tuesday afternoon, September 20. An interesting panel discussion of a subject of interest to both groups is being worked out for this session. Following this feature a color moving picture entitled "Challenge for Tomorrow" will be shown. This is a realistic safety film produced by the Santa Fe, and all who have seen it have agreed that it covers the subject of safety in an interesting and convincing manner.

Separate sessions of the two groups will be featured for the most part by the presentation and discussion of committee reports. Six committee reports are under preparation for the Roadmasters' Association and seven for the B & B Association. In addition, brief reports will be presented by the three standing committees that have been established by the Roadmasters' group.

Aside from the committee reports, one or two addresses on timely subjects will be presented during the Roadmasters' sessions, and the Bridge & Building group will see a color motion picture showing how a vertical lift span was floated into position in a bridge on the Northern Pacific at Pasco, Wash.

On Wednesday afternoon, September 21, members of the Bridge & Building Association will inspect General Motors' Powerama which will be on display on Chicago's lakefront at that time. During the same afternoon, the Roadmasters' group will visit the Gary rail mill of the United States Steel Company.

The only formal social function on the program of these meetings is the annual banquet which, sponsored by the Track Supply Association and the Bridge & Building Supply Association, will be held on Tuesday evening.

The Roadmasters' sessions will be directed by R. G. Simmons, president of the Association, and general roadmaster of the Milwaukee Road. H. M. Harlow, assistant general supervisor bridges and buildings, Chesapeake & Ohio, and president of the Bridge & Building Association, will direct the sessions of that group.

Organizations

American Railway Bridge and Building Association—Elise LaChance, Secretary, 431 S. Dearborn street, Chicago 5. Next annual meeting, September 19-21, 1955.

American Railway Engineering Association—Neal D. Howard, Secretary, 59 E. Van Buren street, Chicago 5.

American Wood-Preservers' Association—W. A. Penrose, Secretary-treasurer, 839 Seventeenth street, N. W., Washington 6, D. C.

Bridge and Building Supply Association—L. R. Gurley, Secretary, 201 North Wells street, Chicago 6.

Maintenance of Way Club of Chicago—S. Kosco, Secretary-Treasurer, 135 East Eleventh place, Chicago 5.

Metropolitan Maintenance of Way Club—Secretary, 30 Church street, New York.

Mississippi Valley Maintenance of Way Club—P. E. Odom, Secretary-Treasurer, Room 1008, Frisco Building, 906 Olive street, St. Louis 1, Mo.

National Railway Appliances Association—Kenneth Cavins, Secretary, 310 S. Michigan avenue, Chicago 4; Lewis Thomas, Assistant Secretary, 59 East Van Buren street, Chicago 5.

Northwest Maintenance of Way Club—L. C. Blanchard, secretary-treasurer, Room 27, Milwaukee Depot, Minneapolis 1, Minn.

Railway Tie Association—Roy M. Edmonds, Secretary-Treasurer, 1221 Locust street, St. Louis 3, Mo. Next annual meeting, October 26-28, Peabody Hotel, Memphis, Tenn.

Roadmasters' and Maintenance of Way Association of America—Elise LaChance, Secretary, 431 S. Dearborn street, Chicago 5. Next annual meeting, September 19-21, 1955.

Track Supply Association—Lewis Thomas, Secretary, 59 E. Van Buren street, Chicago 5.

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Supply Trade News

General

Teleweld, Inc., has appointed the **Wm. H. Ziegler Company, Inc.,** Minneapolis, Minn., and **Lloyd's Railway Supplies,** Denver, Colo., as its sales representatives in those areas.

The **Pennsylvania Salt Manufacturing Company** has moved its executive offices and headquarters of its operating divisions to a new office building at Three Penn Center Plaza in Philadelphia. Included in the move are the following components of the consolidated company: Chemical Specialties Division; I. P. Thomas Division; Industrial Chemicals Division; Sharples Chemicals Division; and Pennsalt International Corporation.

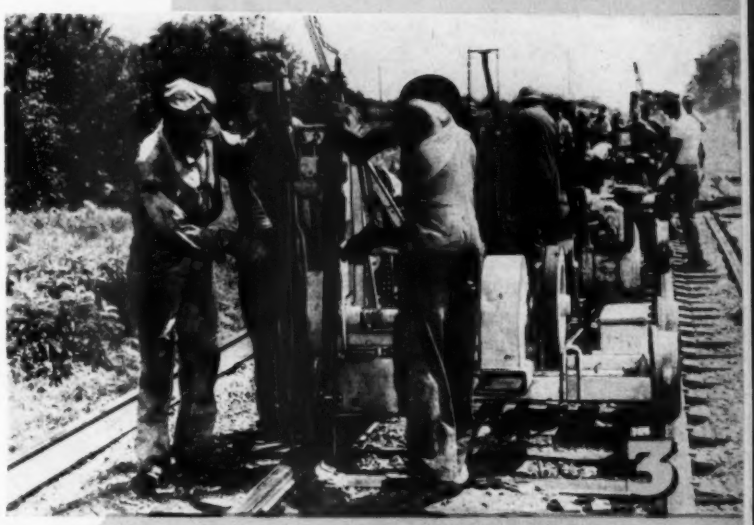
The **Koehring Company,** Milwaukee, Wis., has announced the appointment of three new railroad distributors for the Chicago, New York and Cleveland areas.

(Continued on page 66)

3 NORDBERG *Mechanical Muscles*® that have become STANDARD EQUIPMENT for the nation's railroads

1 NORDBERG POWER WRENCH . . . Provides uniformly controlled tightening of track bolts. Operated by one man, the swinging arm of the Power Wrench easily reaches nuts on the inside and outside of rail. Proved in service on railroads across the country, this machine is ruggedly built to take hard service, yet light in weight to be easily handled on and off the track.

2 NORDBERG ADZING MACHINE . . . Properly prepares tie seats in keeping with today's track maintenance standards, all uniformly level and in same plane. In operation, the machine is held on one rail by adjustable guide rollers. The adzer is readily adjusted for various rail heights and can quickly be set on or off track.



3 NORDBERG SPIKE PULLER . . . Three men and machine easily pull from 30 to 45 spikes per minute, speeding up relaying and reducing the cost of the entire operation.

Proved on the nation's railroads, the Nordberg mechanical Spike Puller is simple in design, easy to operate and maintain. These factors assure low maintenance and maximum "on the job" time.

• **These are just three of the many Nordberg "Mechanical Muscles" that have become the standard for efficient maintenance on the nation's railroads.** ***It will pay you to investigate the full line of modern, money-saving Nordberg track maintenance machinery for meeting today's maintenance needs. For further details on any or all of these Nordberg machines, write for literature.***

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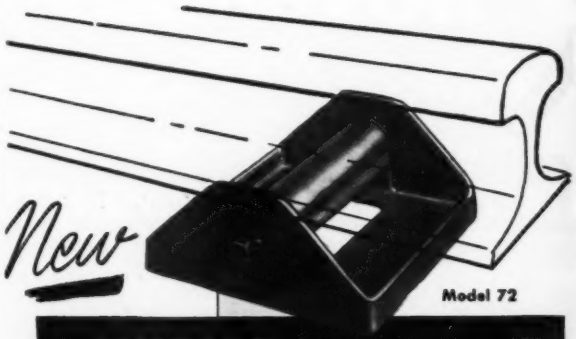

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Makes Rail Bumping Faster, Easier, Safer

A REAL WORK-SAVER WHEN:

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- Lining Up Bolt Holes
- Driving Up Expansion
- Adjusting Switch Points
- Installing Welded Rail

• The Rail Dolly is a heavy-duty roller mounted on a low metal stand. Used in pairs, Rail Dollies handle the heaviest of bumping rails —make accurate bumping possible with less men. Cut damage to rail ends. Far safer than swinging rails with tongs or sliding on greased plates. Guides on each side of Dolly stand prevent rail from slipping off; cleats in base anchor Dolly firmly on top of ties or ballast. Another aid in driving rail, the Simplex Rail Puller and Expander, prevents rail from returning to its original position after bumping. Both devices described in Bulletin RR 72. WRITE:

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Side view, reduced, showing areas of friction lock.

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Manufacturers' Literature

Following is a compilation of free literature, pamphlets and data sheets offered by manufacturers to the railroad industry. Circle the number(s) on the coupon below to receive the desired information. Requested items sent direct by manufacturers.

1. **SPIKE DRIVER.** *Railway Maintenance Corp.* 4-page bulletin (S-55) "Nips Up The Tie . . . Drives Four Spikes" describes, illustrates, gives specifications for new spike driving machine, RMC Spike Master.

2. **REFLECTIVE SHEETING.** *Minnesota Mining & Mfg. Co.* 16-page plastic-bound folder (L-CSSB) "The Central Sign Shop System" describes and illustrates a low cost method for producing effective signs with Scotchlite; includes sample Aluminum overlay, color card and swatch of sheeting, sample letter, and specifications for applicator; production process chart shows flow of operations in typical railroad central sign shop.

3. **TRACTOR AIR COMPRESSOR.** *Le-Roi Div. Westinghouse Air Brake.* 8-page bulletin (T-3) "Around The Clock, Around The World" describes and illustrates the new 125 Tractair, a tractor-air compressor unit; includes condensed specifications and typical applications.

4. **CRAWLER TRACTORS.** *International Harvester.* 30-page illustrated booklet "What's New in International Crawler Tractors and Equipment" lists recent improvements in TD-24, TD-18A, TD-14A, TD-9, TD-6, and T-6 crawlers; includes new TD-24 Torque Converter diesel crawler data.

5. **PORTABLE COMPRESSOR.** *Ingersoll-Rand.* 8-page 2-color flier (2302) "On The Spot . . . Air Power Package" describes and illustrates the 3R-36 cfm self-contained Spot-Air portable compressor, plus I-R air tools and rock drills.

6. **WELDING PUBLICATIONS.** *Air Reduction.* 16-page booklet "Airco Publication List-April 1955" lists over 100 welding and cutting technical reprints, text books, safety booklets, slidefilms and movies available.

7. **WALL COATINGS.** *Standard Dry Wall Products.* 8-page circular (38) and complete A.I.A. File of Thoro System products (including Waterplug, Thoroseal and Quickseal), show procedure to follow for masonry maintenance, rehabilitation, waterproofing, surface treatment.

8. **HIGH STRENGTH STEELS.** *U. S. Steel.* 174-page working handbook "Design Manual For High Strength Steels" (for architects and engineers) contains technical data, charts and formulas on high-strength low-alloy steels.

9. **ROTARY BLOWERS.** *Miehle-Dexter Supercharger Div. Dexter Folder Co.* 6-page bulletin (255) illustrates and describes versatility of application of M-D Rotary Blowers for all industrial products and processes, pressure or suction.

10. **TAPES.** *Bishop Mfg. Corp.* 8-page 2-color catalog (455) "Tapes For Sealing, Splicing, Jacketing, Insulating" describes, illustrates, gives properties and recommended uses, shows typical applications of the company's major tape products.

11. **STEEL PUBLICATIONS.** *Allegheny Ludlum Steel.* 16-page pocket-sized folder "Publication List" describes free literature on selection, fabrication and application of stainless and heat-resistant steels, tool and die steels, electrical steels and alloys, and carbide materials.

12. **SANDBLAST EQUIPT.** *Clementina Ltd.* 20-page catalog "Sandblast With Clemco" describes, illustrates 14 different models from 150-lb. to 1350-lb. sand capacity; includes latest accessory items to fit all sandblast units.

13. **MOBILE FLOOR CLEANER.** *Handling Devices Co.* 2-color bulletin (551) "Which Will Clean Your Floors Faster, Better, More Economically . . . and Control Dust" details features of Floormobile for suction cleaning large floor areas; includes case history.

14. **EYE SAFETY.** *Silicone Paper Co. of America.* 14-page booklet on sight and eye safety; covers the eye, how it works, how it can be injured through misuse, steps taken to aid recovery.

15. **PIPE MARKERS.** *North Shore Nameplate Inc.* 4-page catalog describes and shows uses of the Speedy-Marx Self-Adhesive Pipe Markers, an identification marker system using a special pressure-sensitive tape.

16. **POLYETHYLENE CABLE.** *Anaconda Wire & Cable.* 4-page 2-color folder (DM-5450) "Anaconda Cathodic Protection Cable" describes, diagrams, and gives specifications on the new direct burial Type CP cable with double jacket to check corrosion.

17. **LOADERS.** *Austin Div. Central Ohio Steel Products.* 6-page 3-hole punched fanfold general catalog (LL-914) describes and illustrates the 5 Loader models, contains action photos of each; large detail view of typical Loader.

18. **CENTRIFUGAL PUMPS.** *Rice Pump & Machine Co.* 2-color bulletin (55LW) describes, illustrates, gives specifications on Rice lightweight self-priming centrifugal pumps; includes check list of features.

19. **ZINC.** *American Zinc Institute.* 36-page profusely illustrated booklet (AZI-31) "How Zinc Controls Corrosion" describes the many ways zinc lengthens the life of steel products, and reduces maintenance costs; includes drawings, charts.

Reader Service Department **August, 1955**
Railway Track and Structures
30 Church Street, New York 7, N. Y.

Please send literature circled below:

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	

Also, please send me product information on the following (show product & page number): .....

.....

Name ..... **Title or Position** .....
Company .....
Address .....
City ..... **Zone** ..... **State** .....

Supply Trade News (Cont'd)

(Continued from page 62)

The Mississippi Supply Company, 80 East Jackson Blvd., Chicago, has been named to succeed Hillsman Equipment Company; Red-Co, 30 Church Street, New York, has taken over the eastern territory, formerly covered by Eastern Railway Supplies, Inc.; and the T. C. Johnson Company, 923 Midland Building, Cleveland, has replaced Stanley H. Smith & Co. in that area.

The **National Aluminate Corporation,** Chicago, has changed the name of its Railroad Division to Transportation Division. The scope of the division's work will remain essentially the same—specializing in chemical service to railroads. **J. L. Gibboney,** vice-president of the company, continues as manager of the division, as well as manager of the Export Department and foreign operations. The latter two activities have been combined under the classification—Overseas Division.

Personal

James P. Bowers, assistant sales manager for the **O. F. Jordan Company,** East Chicago, Ind., has been appointed sales manager at that point. Mr. Bowers has been with the company since 1945, serving in various sales capacities.

R. W. J. Harris, assistant to vice-president of the **Rail Joint Company** at Chicago, has been named assistant vice-president.

William P. Morrison has joined the Spray Services Department of the **National Aluminate Corporation** and will maintain offices both at Huntington, W. Va. and at Chicago.

James C. Ryan, who recently retired as superintendent maintenance equipment-system on the New York Central, has been named vice-president of the

James C. Ryan

Matisa Equipment Corporation with headquarters at Chicago. Mr. Ryan will be in charge of all the company's equipment and field operations.

Preferred everywhere . . . because it is the World's MOST POWERFUL ANCHOR

WOODINGS
Advanced Type RAIL ANCHOR

You will find real opportunities for savings in the advanced type WOODINGS RAIL ANCHOR. It is easy to apply, grips with unsurpassed strength and can be removed and reapplied many times!

Send for new bulletin giving details about this anchor, which has received wide acclaim on America's leading railroads.

Unexcelled for use on welded rail

1. To apply, anchor is first hung on rail.

2. Application tool is then used to engage anchor as shown.

3. A short pull of the tool by one man snaps the anchor home, engaging both powerful grip jaws.

4. To remove, simply reverse the application tool and push down.

WOODINGS FORGE & TOOL CO.

Main Office and Plant: VERONA, PA.
Sales Offices: CHICAGO, ST. LOUIS

JACKSON TRACK MAINTAINER

The evidence of this machine's great superiority as a means of both putting up and maintaining track of finest quality — in any ballast, under ALL conditions — is so preponderant that we confidently predict neither you nor any track chief who possesses the complete facts will specify any other. By all means write, wire or phone for complete information before making any commitments.

Acquirement plans to suit your needs.

JACKSON VIBRATORS, INC.

LUDINGTON, MICHIGAN

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